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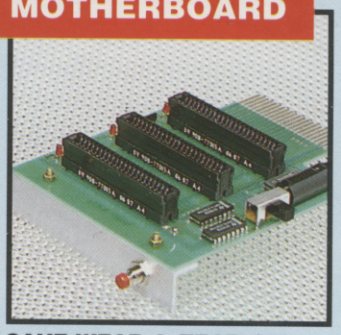

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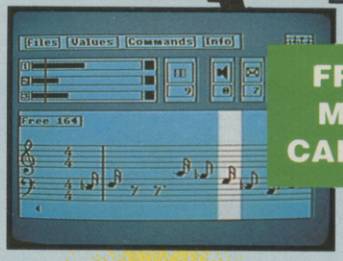

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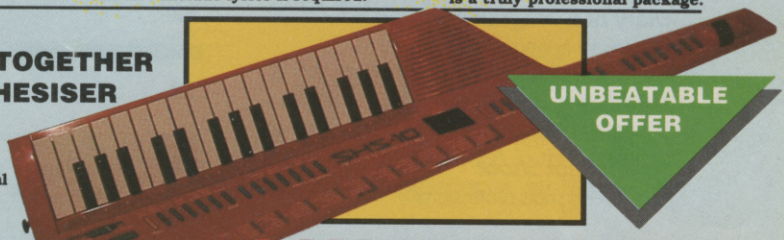

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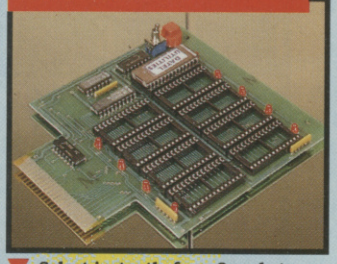

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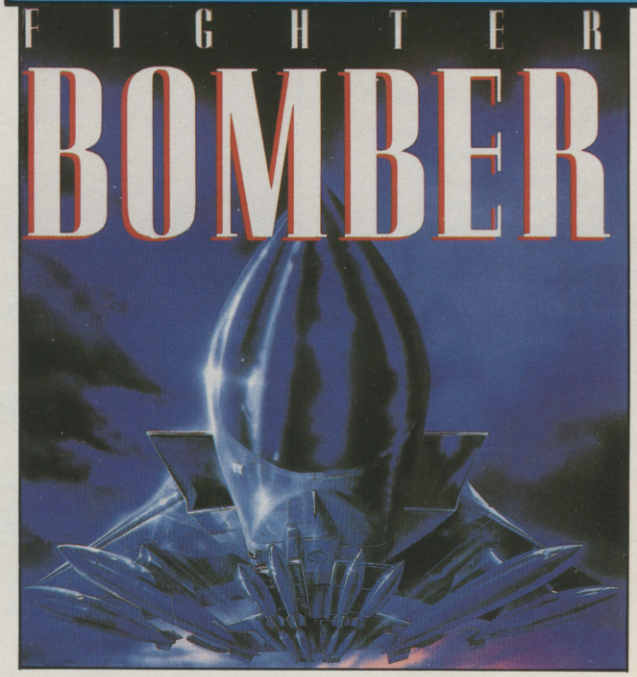

Editor's Comment

I must congratulate each and every one of you in person. I have had a huge response to the competition that I have recently held. It is good to see that so many of you are eager to participate in making **CDU** the success that it is. Because of the response, I am having to postpone the closing date of the *COLOUR PRINTER* competition. Like the *TRIVIA CHALLENGE* comp, the *COLOUR PRINTER* competition will now be extended until the 30th June 1990. So get out your graphic programs and get coding. If you wish to know more about the competition, refer back to the November 1989 edition of the magazine.

This month sees a couple of old favourites reappear. For those of you that got stuck into *Defender* and *Guardian* a few years back, we have **PLAGUE**. Board gamesters among you will recognise *Reversi* in the form of **SURROUND**. And for the younger ones we have a junior version of *Mastermind* called **COLOUR MATCHER. TRIVIA CHALLENGE** gets the final part and we supply the last four fonts for *GEOS* users. Film buffs get a look in with **VIDEO RECORDER PLANNER** which lets you keep tabs on what you have or are about to record.

For those that suffer from dodgy joysticks we provide a handy little **JOYSTICK TESTER**. For the more adventurous graphics programmers there are two very handy utilities, **SCREEN SLIDER** will make it easier to produce a slideshow effect while **SCREEN MANIPULATOR** enables FULL use of all available screen (including the borders).

Finally, on the disk, but not on the menu, you will find the much awaited **CDU** demo. This is not the demo that Andy Partridge is writing his diary for. This is the demo that was promised back in November 1989. Enjoy this month's offerings and I look forward to seeing you all next month.

Disk Instructions

We do our best to make sure that **CDU** is compatible with all versions of the C64 and C128 computers. One point

we must make clear is that the use of fast loaders, cartridges or alternative operating systems (e.g. Dolphin DOS) may not guarantee that your disk will function properly. If you use one or more of the above and you have difficulties, then I suggest you disable them and use the computer under normal, standard conditions.

Getting programs up and running should not present you with any difficulties, simply put your disk in the drive and enter the command.

LOAD"MENU",8,1

Once the menu has loaded you will be able to start any of the programs simply by pressing the letter that is to the left of the desired program.

It is possible for some programs to alter memory so that you will not be able to LOAD programs from the menu correctly until you reset the machine. We therefore suggest that you turn your computer off and then on before loading each program.

How to copy CDU files

You are welcome to make as many of your own copies of **CDU** programs as you want, as long as you do not pass them on to other people, or worse, sell them for profit. For people who want to make legitimate copies, we have provided a simple machine code file copier. To use it, simply select the item **FILE COPIR** from the main menu.

F1: Copy file – the program will prompt you for a filename.
F3: Resave the memory buffer – you may get an error on a save (perhaps you left the driver door open). Use this to try again or if you want to make multiple copies to other disks.
F5: Disk commands – allows you to enter any regular C64 disk command.
F7: displays the disk directory.
F2: Exits the program and returns you to basic.

Disk Failure

If for any reason the disk with your copy of **CDU** will not work on your system then please carefully re-read the operating instructions in the magazine. If you still experience problems then:

If you are a *subscriber,* return it to:

INFONET LTD
5, River Park Estate
Berkhamsted
Herts HP4 1HL
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If you *bought it* from a newsagents, then return it to:

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Protoscan
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Within *eight* weeks of publication date disks are replaced free.

After eight weeks a replacement disk can be supplied from *Protoscan* for a service charge of £1.00. Return the faulty disk with a cheque or postal order made out to *Protoscan* and clearly state the issue of **CDU** that you require. No documentation will be provided.

Please use appropriate packaging, cardboard stiffener at least, when returning a disk. Do not send back your magazine, only the disk please.

Do not send your disks back to the above address if it's a program that does not appear to work. Only if the disk is faulty. Program faults should be sent to the editorial office marked **FAO bug-finders.** Thank you.

Back Issues

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Back issues of **CDU** are available for £3.25 per issue, this includes postage and packing.

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DISK HUNTER – Keep tabs on your disk library.
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VOL 3 No.1 November 89

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B-RAID – Vertical scrolling shoot-'em up.
DISKONOMISER – Prudent disk block saving.
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NEWS

Success in sales has now passed the 200,000 mark in the UK.

Commodore is greeting the new decade with a greater determination. Over the last year it has been attempting to raise its corporate voice over the tumult with a certain degree of success but it is obvious that the present market demands greater efforts.

In the States the recent financial report was, to say the least, a case for concern and Europe is proving to offer the best opportunities for the future. Accordingly **Commodore Marketing International** has been created to give marketing support to all of the company's European subsidiaries.

Official Split

Database Software is dead, long live **Database Software** is the cry as the creators of **Mini Office** create an office of their own.

The **Europress** Group has cut the cord attaching **Database Software, Database Educational Software** and **Mandarin Software** to the mother company. The newly formed, autonomous subsidiary will still trade under their well-established labels but will exist under the overall company name of **Database Software**.

The move will avoid the domino effect which a segmented company suffers from when one of its divisions starts to fail. Under the new arrangement **Database Software** will sink or swim according to the combined skills of the new managing director. Chris Payne, and his team. This will also cushion the company from the fortunes of the other branches of the **Europress** Group.

Europress chairman, Derek Meakin, explained, "The Database Software team has more than proved that it can hold its own in the market. It has been responsible for a string of spectacular successes including STOS, the games creator, and Fun School II, easily the best selling educational package of all time."

The company plans to release over 20 titles throughout this year and hopes to dispell its old reputation as a single-product company forever.

Code Comfort

British Telecom is hoping that the proposed V.42lb is to be a communications standard for Local Area Networks (LANs) and future modem products. At the heart of the proposed system lies BT's own data compression system which could become a world standard in time.

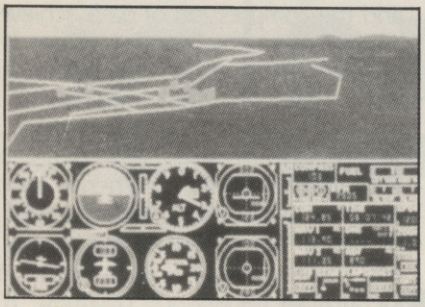
The BT system is known as BTLZ and the compression of data achieved allows up to three or four times the amount of data to be sent within the same timespan. The compression is achieved by matching a string of characters with the contents of a word and phrase dictionary. When a match is found, the string is replaced with a numerical codeword. At the receiving end the codeword is matched to an identical dictionary and decoded. The dictionary is automatically updated during normal operation, with new strings being added and disused strings deleted.

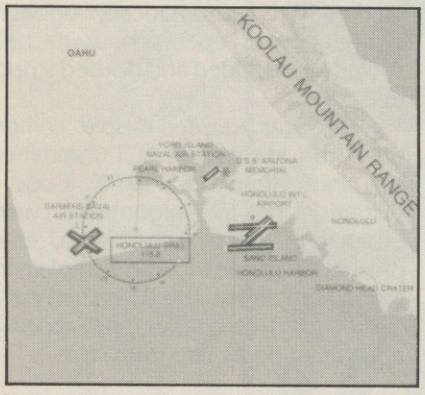
BTLZ was adopted despite competition from **Hayes,** the ACT CommPressor and **Microcom's** MNP Class 7 systems. The five algorithm's were evaluated against two criteria, compression performance and implementation complexity. The BT system came top in both categories and approval appears to be a mere formality.

Flying a kite

Future pilots may be able to log up the flying hours required to maintain currency of their licences without leaving the ground. **SubLogic** is currently trying to convince the US licencing body, FAA, that the **SubLogic Flight Controls I** (not available for the C64) and **Microsoft Flight Simulator II** for PCs together form a viable aircraft for all practical purposes.

SubLogic is THE company when it comes to producing flight simulators. Apart from its own disk-based series of sims for the C64, it is also the creator of the world renowned **Flight Simu-**





lator which **Microsoft** adopted as its own. **Flight Controls I** is a unit which reproduces a realistic aircraft control yoke along with the principal controls, such as T-handle, throttle, gear and flap switches.

SubLogic's C64 products have greater flexibility than any of its competitors because, once a specific aircraft simulator (such as **Jet** or **Stealth Mission**) has been bought, scenery disks can be bought which allow the user to try the plane out over new landscapes. Latest additions to the C64 scenery disks are **Hawaiian Odyssey**, a scenery adventure, and the **Scenery Disk 9** which covers Chicago, St Louis and Cincinnati.

Hot Sega from Rod

(Hot) Rod Cousens' **Activision** team is launching the C64 version of **Sega's Hot Rod** driving game.

The 30 tracks featured in the game allow the user to experience various weather conditions ranging through rain, snowdrifts and ice. Physical obstacles such as rock slides and slippery sand are also featured.

With all these problems a driver needs spare parts and these can be bought from the parts shop at the start of each race – the better you perform in each race, the more you have to spend on specialist spares. The shop stocks spike tyres, snow tyres, bumpers and wings. The drivers must use their judgement to choose suitable spares for the weather conditions but with the police on your tail and construction crews making life difficult, you may have more to use than your chains. **Hot Rod** is available on disk for £14.99 and a cassette version costs £9.99.

Mobile Matrix

A printer for £99 is sure to attract attention and a portable version for £159 is sure to generate more than a few enquiries to **Applied Systems Developments**.

The **Personal 80** thermal printer is aptly named, having a width of 80 columns and speed of 80 characters per second. The unit is about the size of a 1lb box of **Milk Tray**, three times heavier and doesn't require an SAS-trained deliveryman.

The portable version can be mains operated but will also plug into a car cigarette lighter socket or run off its own internal rechargeable battery. The portable contains its own battery charger and both versions require interfaces for C64 use. The quoted prices include a 100ft roll of paper but do not include VAT. ASD can be contacted on 0724 281317 for further details.

D Movies

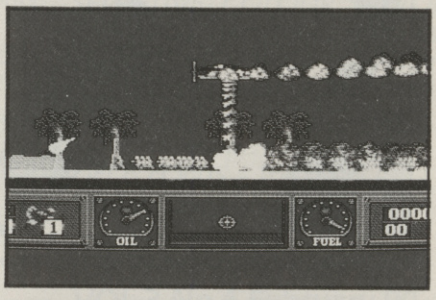
Domark's latest **Tengen** arcade conversion, **Escape from the Planet of the Robot Monsters**, may sound like a B movie but if it's only half as good as **Hard Drivin'** it will be another success for them to notch up.

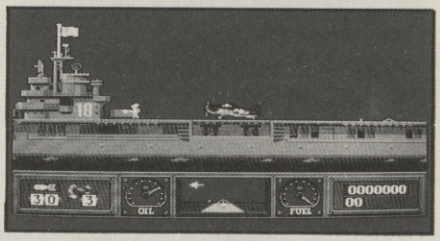
If we were the kind of magazine which handed out awards, **Domark** would surely get one as the most improved software house. From relatively humble beginnings the company has never looked back since acquiring the **Trivial Pursuit** and **Starwars** licences. These products have swelled the coffers sufficiently to allow the company to increase its product output to a very healthy level.

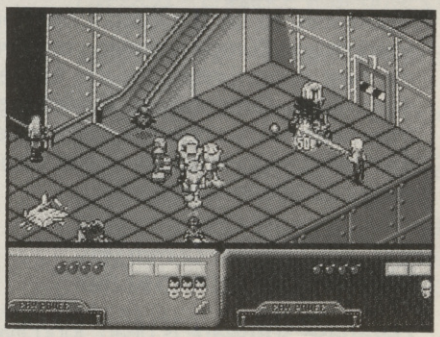
Escape is just one of the latest batch of releases and involves Jake and Luke, two would-be heroes who land on the Planet X to rescue the evidently brainy Professor Sarah Bellum from the evil Reptilons.

Alongside this release we are also expecting **Wings of Fury** which is the latest of **Domark's Broderbund** imports. As a WWII pilot guarding the USS Wasp, the player has to create mayhem among the enemy by using the not insignificant fire power of the aptly named Hellcat aeroplane to defeat the Japanese attackers.

Domark has also agreed to market **Incentive's** latest game for them. In







Castle Master, evil spirits abound as you wander about a 3D landscape seeking to free yet another imprisoned princess.

...it's dynamite!

POWER CARTRIDGE

FOR YOUR COMMODORE 64/128

"...unbelievable value for money" ZZAPP! Dec 89

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- POWER MONITOR
- TAPE & DISK TURBO
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- POWER RESET
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..."Money well spent" YC/CDU Jan 90

42 Pg Manual - "Damned Good Handbook" CCI Jan 90

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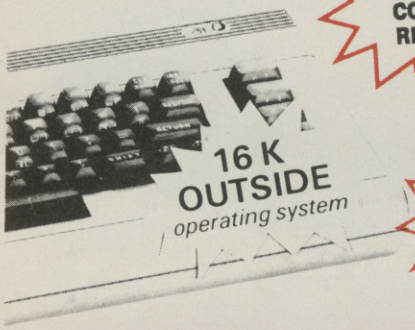

..."highly recommended for C64 users" CCI Jan 90

YOU WILL WONDER HOW YOU EVER MANAGED WITHOUT IT

POWER TOOLKIT

A powerful BASIC-Toolkit (Additional helpful commands) that considerably simplifies programming and debugging.

AUTO	HARDCAT	RENUMBER
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COLOR	HEX$	SAFE
DEEK	INFO	TRACE
DELETE	KEY	UNNEW
DOKE	PAUSE	QUIT
DUMP	PLIST	MONITOR
FIND	ILOAD	BLOAD

RENUMBER : *Also modifies all the GOTO's GOSUB's etc. Allows part of a program to be renumbered or displaced.*

PSET : *Set up of printer type.*

HARDCAT : *Prints out Directory.*

The toolkit commands can be used in your programs.

DISK TOOL

Using POWER CARTRIDGE you can load up to 6 times faster from disk.
The Disk commands can be used in your own programs.

BLOAD	DVERIFY	DIR
DSAVE	MERGE	DEVICE
DISK		

MERGE : *Two BASIC programs can be merged into one.*

DISK : *With DISK you can send commands directly to your disk.*

TAPE TOOL

Using POWER CARTRIDGE you can work up to 10 times faster with your data recorder. The Tape commands can be used in your own programs.

LOAD	SAVE	VERIFY
MERGE	AUDIO	

POWERMON

A powerful machine language monitor that is readily available and leaves all of your Commodore memory available for programming.
Also works in BASIC-ROM, KERNAL and I/O areas.

A ASSEMBLE	I INTERPRET	S SAVE
C COMPARE	J JUMP	T TRANSFER
D DIS-ASSEMBLE	L LOAD	V VERIFY
	M MEMORY	W WALK
F FILL	P PRINT	X EXIT
G GO	R REGISTER	$ DIRECTORY
H HUNT		DOS Commands

PRINTERTOOL

The POWER CARTRIDGE contains a very effective Printer-Interface, that self detects if a printer is connected to the Serial Bus or User-Port.
It will print all Commodore characters on Epson and compatible printers.
The printer-interface has a variety of set-up possibilities. It can produce HARDCOPY of screens not only on Serial printers (MPS801, 802, 803 etc) but also on Centronic printers (EPSON, STAR, CITIZEN, PANASONIC, etc).
The HARDCOPY function automatically distingishes between HIRES and LORES. Multi-colour graphics are converted into shades of grey. The PSET functions allow you to decide on Large/Small and Normal/Inverse printing.
The printer PSET functions are:

PSET 0 - *Self detection Serial/Centronics.*
PSET 1 - *EPSON mode only.*
PSET 2 - *SMITH-CORONA mode only.*
PSET 3 - *Turns the printing 90 degrees!!*
PSET 4 - *HARDCOPY setting for MPS802/1526.*

PSET B - *Bit-image mode.*
PSET C - *Setting Lower/Upper case and sending Control Codes.*
PSET T - *All characters are printed in an unmodified state.*
PSET U - *Runs a Serial printer and leaves the User-port available.*
PSET Sx - *Sets the Secondary address for HARDCOPY with Serial Bus.*
PSET L1 - *Adds a line-feed, CHR$ (10), after every line.*
PSET L0 - *Switches PSET L1 off.*

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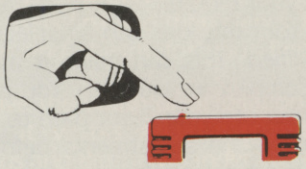
POWER RESET



On the back of the POWER CARTRIDGE there is a Reset Button. Pressing this button makes a SPECIAL MENU appear on the screen.
This function will work with any programme.

CONTINUE - *Allows you to return to your program.*
BASIC - *Return to BASIC.*
RESET TOTAL BACKUP DISK - *Saves the contents of the memory onto a Disk. The program can be reloaded later with BLOAD followed by CONTINUE.*
RESET ALL TOTAL BACKUP TAPE - *RESET of any program.*
HARDCOPY - *At any moment, prints out a Hardcopy of the screen. Using CONTINUE afterwards you can return to the program.*
MONITOR - *Takes you into the Machine language Monitor.*

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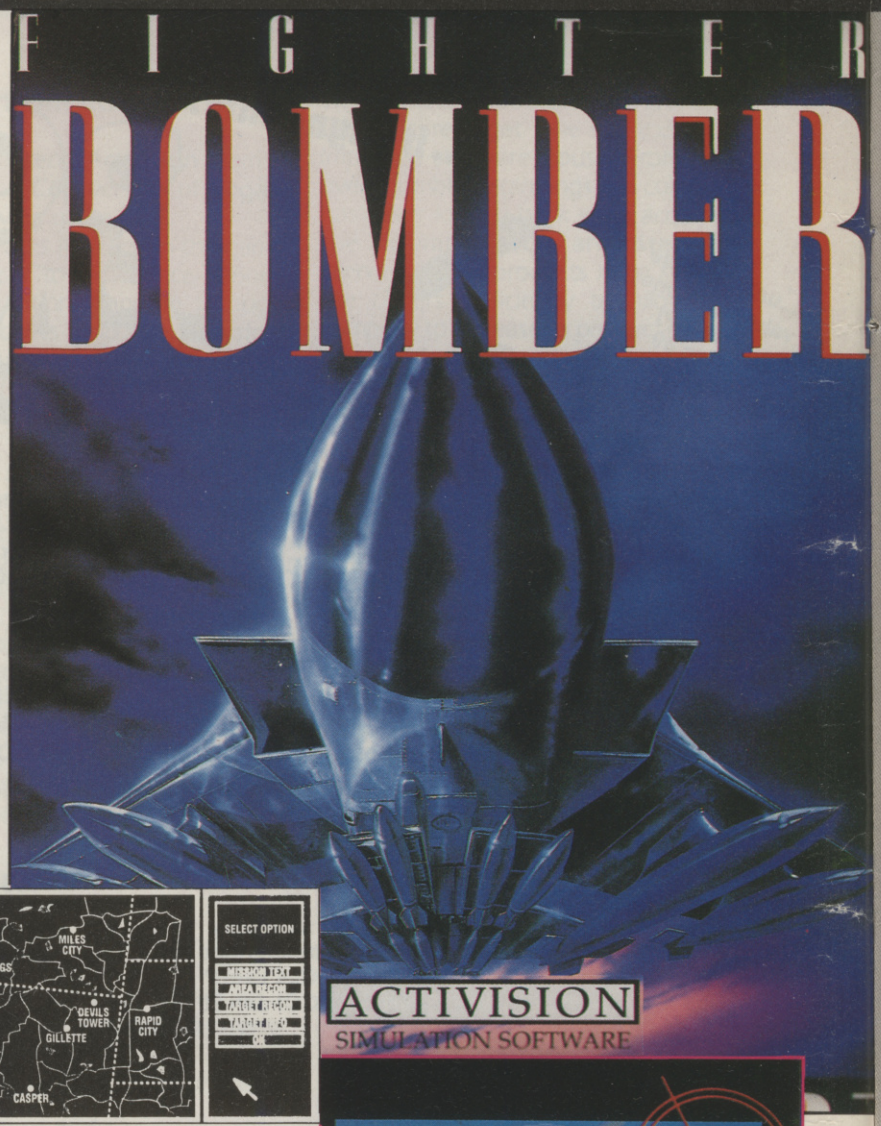
FIGHTER BOMBER



This latest offering from *Activision* puts you at the controls of the most deadly of combat aircraft. The planes available are a combination of Fighter and Bomber. This makes them not only versatile in target but also in range of mission. **Fighter Bomber** gives you a choice of seven different planes and a variety of missions.

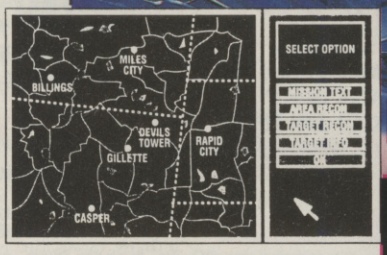
These missions vary from strategic to offensive and all have relevant codenames. They are all adjustable according to how adventurous you feel. Not all of the aircraft can undertake the missions; some have a shorter range than others, some have a heavier payload. This allows them to carry more and bigger bombs and missiles. Fuel capacity is also a deciding factor in selecting the plane for you.

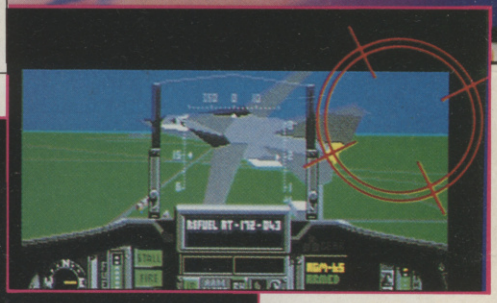
All of the planes and weapons are detailed within the manual. This is fairly comprehensive and gives adequate coverage of the major features of the game. It is clear and has enough illustrations to clarify the more complex sections. Once through the manual you should be ready to undertake your first mission.

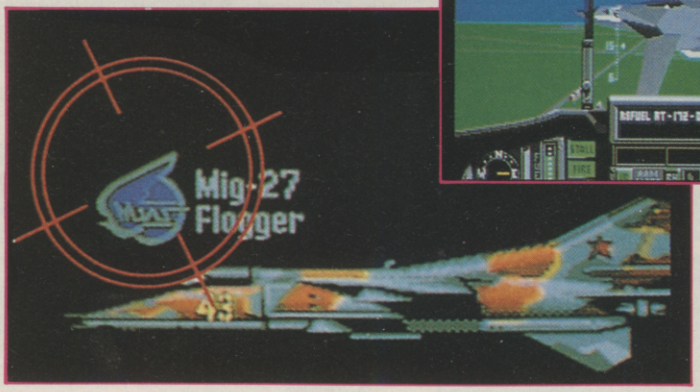
Choose an aircraft from the one screen menus and then arm it. This is done on screen with a good graphic representation of the aircraft and the weapons. For those of you who are in a hurry there is an automatic arming section. Otherwise you can select any mix your require.

Your missions can be selected and modified. This can make it as simple or complex as you wish. You can plan or re-route your flight path to accommodate the adjustments before take off. You begin at the end of the runway and with the wheelbrake on. Thrust can be selected in a revolutionary and sensible way; the number keys control the thrust, from 10% to 100% and afterburners. This gives great control over the speed of your plane. Pulling back and climbing too quickly results in an engine stall. This is almost always fatal to the mission.

The hardest part of a simulator tends to be landing so it's worth practising this a few times before getting on with the mission. There is a nice mixture of controls and the game has several unusual views available. These include views from above, the control tower, the side, the enemy plane or the weapons! All of these can be rotated through 360 degrees.







Graphics are a mixture of wire frame and solid 3D. This is unfortunately the game's downfall, as the inclusion of solid graphics slows the game down very much. This is a pity, because technically the game has achieved a lot. Disk access is fairly quick between menus and so there's little waiting around between games.

Activision has come quite close to a success with **Fighter Bomber**. All of the ingredients are present, but it is probably this that makes the game slow down so much. The programmers might have been more successful if they had dropped some of the views and tried to speed up the graphics.

Marcus Bamford

AT A GLANCE

Title: Fighter Bomber
Supplier: Activision, 0734 31166
Price: £9.99 (cassette), £14.99 (disk)

Disk Dungeons

Gordon Hamlett takes us further into the world of fantasy.

Not very much to report this month due both to lack of space and lack of anything interesting happening in the industry.

There is always a sense of achievement when you discover a new location in an adventure of role playing game. Somewhere different to explore and a gap filled in on your map. Some people though seem to prefer mapping to any other aspect of a game in which case they should be positively quivering with expectation when they hear about the latest game to come from the Electronic Arts stable.

Starflight is a science fiction game in which you must assemble a party of six characters from five different alien races each with their own individual skills. Once you have your crew, it's time to go off exploring and colonising the 270 star systems and 800 planets. Each planet though has a mere 1.9 million unique locations !!! giving a total for the galaxy of about 1½ billion places to map!!!!!!!

Combat is not the real aim of this game even though you are equipped with all the latest hi-tech weaponry. Communication and rapport with the aliens as you explore ice, lava, rock, ocean and gas planets. Hopefully there should be a full review next month if I can find my way back again.

On to more serious matters. Last issue, we published a controversial letter from Peter Davies in Cardiff about the morality of role playing games. I have asked both S.S.I. and Electronic Arts to comment on this but so far, no response has been forthcoming. Watch this space.

Finally this month, here is the start of my hints and tips section for Curse of the Azure Bonds. This month's offerings are only general hints, concentrating on reasonable tactics and don't give too much of the plot away. That comes later!

1 If you can do so, transfer your characters over from Pool of Radiance as they will almost certainly be higher than 5th level. You may however want to change the structure of your party. Don't worry about who is carrying what as you lose all your equipment as at the start of the game anyway.

2 Try not to take any elves in your party. They cannot be resurrected and it is a racing certainty that they will get killed at least once.

3 A Paladin is a useful addition to your party due to his permanent protection from evil spells cast around him and his ability to cure light wounds when your cleric has been knocked unconscious. The rest of my party which successfully completed the game consisted of another fighter, a dwarf fighter/thief, a magician and an elf magic user/fighter.

4 Pay particular attention to how far your characters can advance. There are restrictions due to both race and ability scores. You will need at least five of your party to be up to 11th level by the end of the game (possibly less for multi-classed characters). If your characters can't go beyond 5th or 6th level, ditch them at the start of the game.

5 Effective combat tactics are the key to success.

6 Make sure that you hit every enemy spell caster every round. They can do your party serious damage if they are allowed to get their spells off – hold person, slay living, fireball and lightning bolt can all cause the early demise of one of your characters.

7 If you can't get a spell off at an enemy image or cleric, use missiles. This is where the magic user/fighter is so useful. Stuck at the back of the party and with a magic bow in his hands, he is very useful for off specific targets.

8 Get your fighters to concentrate on one opponent at a time where-ever possible. It is better to have one dead enemy and two healthy ones attacking you than three wounded ones.

9 Make sure that you are using the right weapon for the job. If a magic weapon has special abilities against a particular monster type, then use it. For this reason, it is worth paying to have every magic item identified. If you pick up a sword and see that it is +1 from the amount of damage it causes, you might never discover that it is +3 against undead creatures or whatever. Anyway, there is precious little else to spend your money on apart from training.

10 Distribute magic armour throughout your party. It is not a good idea to have one character at -6 armour class when all the rest at +1 or 0. Bracers and rings of protection should go to magic users first and then clerics. Keep armour and shields for your fighters.

11 Give the wand of defoliation to a cleric. It works against shambling mounds and Bits of Moander etc. Have your magic users cast magic missiles at these beasts.

12 Given the choice between casting a spell or using a wand that does the same thing, cast the spell. It is invariably more powerful. Save your wands for when you are hit and are unable to cast a spell.

13 Finally, take note of the program when it warns you that you are about to enter a dangerous situation. Save your game, then hole up and rest and try to re-learn all your spells. It is always worth having two separate save game disks. There is at least one major bug in the game that throws you into an infinite loop.

Cheats, Pokes and all that!

You've got the magazine, you've got the disk. Now you can have all the info for completing your games

By Jason Finch

After many hours of dedicated hacking I am pleased to be able to reveal the numbers a lot of you will probably have been waiting for – those infamous POKEs that give you infinite lives, energy and so on. However, with many excellent games being published in Commodore Disk User I decided that instead of working on commercial games, I would provide the POKEs for games that have appeared in CDU. Below you will find a selection of game titles together with a variety of POKE commands and their results.

For the majority of them you will require a reset switch, usually in the form of a cartridge. If you have a cartridge like Action Replay or the Expert then even better – simply freeze the game and enter the POKEs directly. However, where it is possible to do so, I have given suggestions on alternative methods for entering the POKEs should you not have some sort of external reset facility.

I am very sorry if the game that has had you throwing large objects at your television or monitor does not appear. You will have to find the cheat POKEs for yourself. I also realise that some of you out there absolutely detest people who ruin your enjoyment of a game by tempting you to enter the POKEs that make the games so much more simple. All I say to those people is: If you don't want to cheat then don't enter the POKEs!

Volume 1, Issue 1:

Ski Run

For infinite misses – POKE 49997,162: POKE 49998,1
To prevent trees killing you – POKE 22551,68: POKE 22565,92: POKE 22597,22: POKE 22611,92
Restart the game with SYS 25540 (The display will appear strange at first but it will soon correct itself when you start playing.)

Volume 1, Issue 2:

Xeropus

For infinite lives – POKE 2273,173
This must be entered BEFORE the program is RUN.

Cosmic Cavern

To prevent death when you hit the walls – POKE 5688,169: POKE 5689,0: POKE 5690,234: POKE 5843,169: POKE 5844,0: POKE 5845,234 Again, these must be entered before RUNning the program.

Quad

For infinite lives – POKE 16431,173
Restart with SYS 16384
If you would like an "auto-pilot" mode, then start the game, reset the computer and enter the following program. Type RUN and when the game starts you will be in auto-pilot mode! Hold FIRE

FINDERS KEEPERS 20 DATA 169,001,141,051,019,096,-1

and move the joystick for normal play.
10 FOR N=0 TO 54: READ A: POKE 16128+N,A: NEXT
20 POKE 16401,32: POKE 16402,0: POKE 16403,63
30 SYS 16384
40 DATA 169,127,56,237,0,220,41, 16,208,41,173
50 DATA 0,208,141,2,208,141,4,208, 173,1,208
60 DATA 141,7,208,141,9,208,173, 16,208,41,1
70 DATA 240,8,173,16,208,9,6,76, 48,63,173,16
80 DATA 208.41,141,16,208,173,169, 77,96
If you do not own a reset cartridge then simply insert the above lines into the QUAD loader. You will need to alter the line numbers to fit between 60 and 80 inclusive.

Volume 1, Issue 3:

Chaos In Space

For infinite lives – POKE 27803,173
Restart with SYS 26624 (or alternatively add the POKE command to the loader program just before the call to start the game.)
The game will, however, still end if the invaders reach the bottom of the screen.

Volume 1, Issue 6:

Scorpion

For infinite lives – POKE 6372,173
To prevent the enemy firing – POKE 5012,169: POKE 5013,0: POKE 5014,234
To stop death when in collision with enemy – POKE 6281,169: POKE 6282,0: POKE 6283,234
Restart with SYS 28000

Volume 2, Issue 2:

Blastball Good

For infinite lives – POKE 20196,173
To stop the background moving – POKE 19477,0
To remove the scrolling background completely – POKE 19477,14: POKE 19478,169: POKE 19479,0: POKE 19480,234
Restart with SYS 16384 (or alternatively add the POKE commands as line number 15 of the BASIC loader.)

Colour Bind V Good.

(Quite a lot for this one!)
To prevent death at zero time – POKE 33247,76: POKE 33248,25: POKE 33249,130
However, this will also prevent voluntary death in an impossible situation. Therefore you should also enter POKE 36343,255: POKE 33244,255: POKE 33245,240: POKE 33246,21
For 9999 units of time on bonus screen – POKE 38185,35: POKE 38196,35
For infinite lives – POKE 36245,189
Restart with SYS 39424
However, if you do not own a reset cartridge simply type the following from power-up:
LOAD"PART1",8,1
LOAD"PART2",8,1
POKE.....(enter your POKEs here)
SYS 39424

Microdot V Good.

For infinite jumps – POKE 38751,173
To stop yourself being killed – POKE 39192,96
With the latter your player may appear to be fixed in one position, unable to move, if he is in collision with a static enemy sprite. To rectify this, simply keep pausing and resuming the game whilst pushing on the joystick.

Volume 2, Issue 3:

Bazair

For infinite lives – POKE 19524,173: POKE 21629,173: POKE 23371,173: POKE 25568,173: POKE 26872,173: POKE 29655,173: POKE 51813,173
Restart with SYS 49152

Volume 2, Isue 6:

Cellrator No Good

To enter cheatmode press the C= (bottom left of the keyboard), SHIFT and CTRL keys simultaneously during the game. The word "CHEATMODE" should appear in the bottom status panel. To resume normal play press RETURN.

Coball NOT BAD

A strange one this. Simply reset the computer and restart the game with SYS 16579. When you start, although you won't begin at the correct place, you will have infinite lives.

Fortress EASY

For infinite hypercrafts – POKE 4522,173
To prevent collisions with walls – POKE 4490,169: POKE 4491,0: POKE 4492,234
Restart with SYS 2080

Rainbow chaser V Good.

For infinite stamina – POKE 48381,165
For infinite stars – POKE 46171,12
To jump higher – POKE 43772,10
For some indication, with the latter the usual setting is only three.
Restart with SYS 32768

Volume 3, Issue 1:

Orsital

To prevent death at zero power – POKE 38401,76: POKE 38402,228: POKE 38403,149
To jump higher – POKE 34313,100
Restart with SYS 40269

Wabbit EASY Good.

For infinite rabbits (no jokes about the birth rate, please!) – POKE 21462,173
Restart with SYS 20000

B-Raid Good

Another one created with Shoot-Em-Up Construction Kit (although it doesn't work with them all) so simply reset the computer and restart with SYS 16579. You will begin a little further on than usual but with infinite lives.

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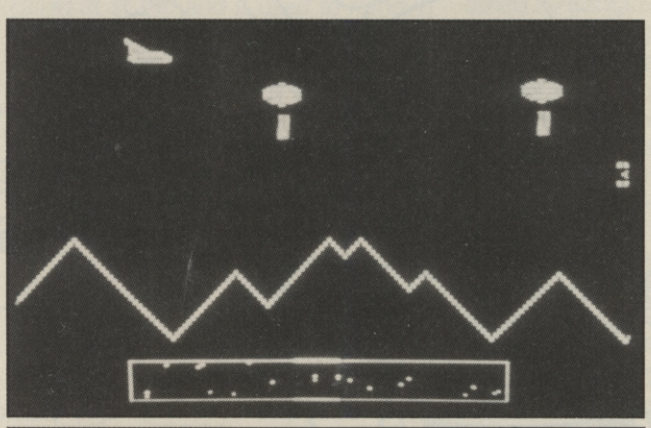
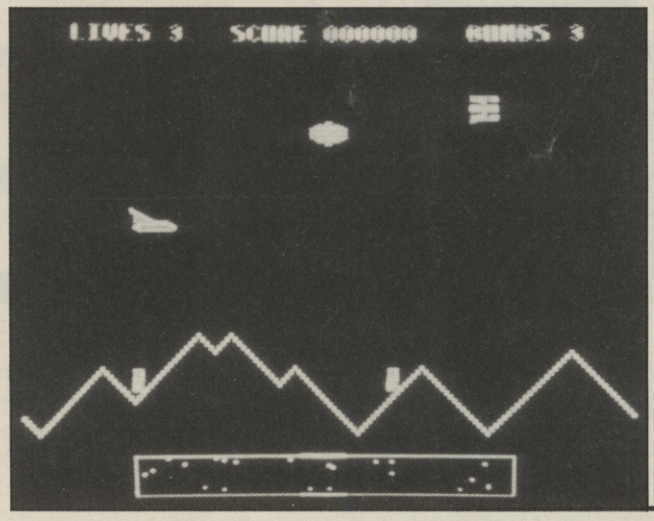
Plague

There are still some games that the 16 bit machines can't equal. This is one of them.

By Richard Little





Commodore 64 games players will have noticed the increase in technical excellence displayed in programs over the past year or so. In particular the use of sprite 'multiplexing', where there are more than 8 sprites on sceen at once, has become very widespread. Sprites in the border are now common, and complex sound effects are taken for granted. 'Plague', the game you are about to play, is my own attempt at some of the above. For those of you that didn't already know, the game is based on the Williams classic; 'Defender'. The program is capable of displaying up to 24 aliens on screen at once, in addition to the 8 sprites which make up the radar in the bottom border. Landscape scrolling occurs at a rate of up to 8 pixels per screen scan.

Game Strategy

The game is controlled entirely with a joystick in part 2. The ship accelerates in the direction of the joystick and moves from one side of the screen to the other to allow for a maximum forward view. Lasers are fired by rapidly pressing the fire button. In addition, the ship is equipped with three smart bombs which destroy all aliens on screen. The bombs are fired by holding the fire button down for a longer period. In this way you need never remove your hand from the joystick. The ship has considerable momentum and it takes practice to control it effectively. The object of the game is to destroy all aliens in each sector while protecting the men who are stranded on the landscape. The alien types are as follows.

A) Flotation mines: These follow a set pattern across the landscape and provide a moving obstruction to the player.

B) Planters: These hunt down the men on the landscape. When directly overhead a target man they descend to capture him. The man is then carried to the top of the screen where he is absorbed and the planter mutates. If the planter is destroyed before reaching harmlessly to earth.

C) Mutants: These fly at high speeds with the sole aim of destroying your ship. Although they are the fastest of the aliens, they also have the most momentum and are not capable of rapid changes in direction.

D) Pods: On later levels these pods hover motionless in space. Destruction of a pod causes the release of four swarmers. Using a smart bomb will also cause the release of the swarmers.

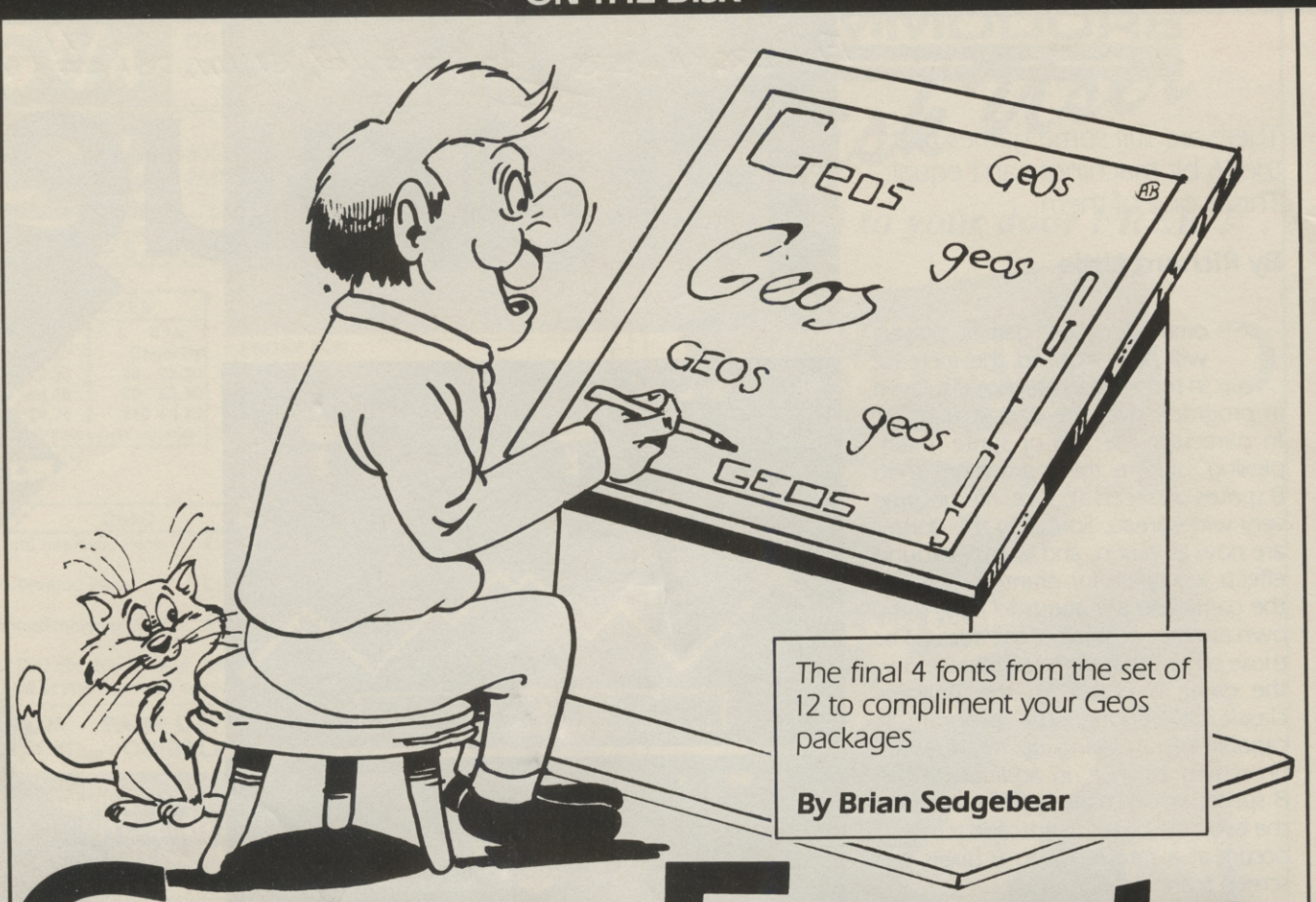
E) Swarmers: These fly at constant horizontal velocity but can change vertical velocity rapidly. They operate in two modes. 1) Attack mode, where they home in to your ship. 2) Defensive mode, where they try to avoid being destroyed during a chase.

Contact with any of the above aliens results in the loss of one of your three lives. An extra life and smart bomb is gained every 1000 points.

You are allowed to enter up to 8 letters in the high score table at the end of the game. This is achieved by positioning the sights over each letter and pressing the fire button.

The radar screen shows the position of all aliens and men in relation to your ship, which is always central on the radar. The radar only updates twice a second and account should be taken of this when flying at speed.

Credits must go to Mr. Neil Higgins for his excellent Sound FX utility (CDU May/Jun 1989) which allowed my first C64 game to be a noisy one; and Mr. Jason Finch for his Border Sprite program (CDU Jan/Feb 1989) from which I gleaned the secret of this useful C64 quirk. Enjoy the game.



The final 4 fonts from the set of 12 to compliment your Geos packages

By Brian Sedgebear

Geos Fonts

In the last two issues of the magazine, I have provided you with eight new fonts, and an insight into the inner workings of GEOS. This month I will finish off by showing you how GEOS menu's are constructed, both vertical and horizontal, and some of the special features GEOS provides.

Menu's in GEOS are set up in a similar way to icon's, using a simple table structure. The first main menu is set up by a call to a GEOS routine at $C161 called DoMenu. Many of the sub-routines in the GEOS operating system use a very simple way to pass variables, this is called in-line calling. As DoMenu uses this method it would be a good idea for me to take a slight diversion and explain it. When DoMenu is called using a JSR, the DoMenu routine will then pick up the parameters it requires from the bytes immediately following the call. (the address for these parameters is found in the stack as this is where GEOS would find where to return to when it encountered an RTS.) DoMenu then places a corrected return address in the stack, so that program operation will continue immediately after the parameters when an RTS is encountered. This method saves a lot of memory space when a routine is called regularly. An example showing the parameters needed by DoMenu is shown in figure 1.

Figure 1

```
JSR $C151   : Call GEOS DoMenu
              routine.
.word       : Inline word containing
              address of Menu Table.
.....       : Rest of user program.
```

When this call is made the menu depicted in the table is displayed on the screen and the GEOS Kernal will automatically monitor and detect any action on a menu item. The Main menu table is set out as follows, the first six bytes give the location of the four sides of the menu, starting with top(byte) and followed by bottom(byte), left-(word) and right(word). We then have a single byte called the menu type byte, bit 7 of this byte tells GEOS if the menu is vertical or horizontal with bit 7 set being a vertical menu. Bit six of this byte tells GEOS if the menu is to be restricted, in a restricted menu the mouse can not move off the menu on any side except the top and is very useful in large menu's and particularly horizontal menu's. If bit 6 is set the menu will be restricted. Bits 0-3 are used to tell GEOS how many items are to be included on the menu with a maximum number of 15, and the remaining bit's are not used. Finally we have the menu entry's to be included on the menu, each entry is three bytes long. The first byte of each entry is a pointer to the text string for that menu entry, the second byte is the type of entry and tells GEOS whether to run a service routine, open a sub-menu or use a dynamic sub-menu, all will be revealed shortly. The final byte for each entry is a pointer to either the sub-

menu structure or service routine required. Following the final menu entry data, the actual text strings for that menu are stored, each ending in usual GEOS fashion with a null byte. A Main menu table would therefore look like Figue two.

Figure Two

.0.0 : top of menu.
.00 : bottom of menu.
.0000 : left side of menu.
.0000 : right side of menu.
.00 : menu type. (vertical, restricted, no. of items)

.Menu Entry One

.00 : pointer to text string.
.00 : type of entry. (service routine, sub-menu, dynamic)
.00 : pointer to menu structure or service routine.

.Menu Entry Two

and so on.

Above I mentioned another GEOS feature, the dynamic sub-menu, basically this is a special function that enables you to run a service routine before displaying a new sub-menu. This is vital if you wish to check the disk to see what selections to display in the sub-menu, an example is when font is selected in GEOpaint, and must identify the fonts on the disk before the menu is displayed.

Many of the Main menu items when clicked will activate sub-menu's, again GEOS uses a table for each sub-menu and is laid out in exactly the same way as the Main menu and has access to all the same facilities. Sub-menu's are automatically displayed when their Main menu subject is clicked, the location of the sub-menu table is passed in the main menu table and executed by the GEOS Kernal.

Most of the menu dimensions can only be found by testing, but try to ensure there is enough room as GEOS does not like running out of room when dealing with menu's. Also remember that the maximum number of nested menus is 4.

Their are four GEOS sub routines dealing with menu operation, DoMenu which we have seen above, ReDoMenu, DoPreviousMenu and GotoFirstMenu. ReDoMenu is called at $C193 and is used by an applications service routine that was called from a menu to re-enable that menu for another selection to be made. Geofile uses this regularly if you would like to see it in action. DoPreviousMenu is called at $C190 and is used to remove the present menu and re-enable the previous menu for a further selection, one thing to remember is to reposition the mouse over the previous menu or it will also be withdrawn by GEOS. Finally GotoFirstMenu is called to remove all the sub-menu's leaving just the Mainmenu.

One thing I have missed is the values to store in the menu type of entry, they are as follows. $80 = Sub-menu. $40 = Dynamic sub-menu. $00 Call service routine.

Well I hope that has given you an insight into GEOS menu operation. Now we look at the impressive dialog boxes of GEOS.

I have not had room to discuss some of the other vital and impressive areas of GEOS, like the disk and printer management and the graphics facilities available to the programmer and user alike. If you want to know more about these go out and buy the GEOS programmer's reference guide published by Bantam Books, it is extremely good. What is a dialog box? Well dialog boxes are designed primarily as a means of extracting information from and providing information for the user. Examples of dialog boxes are as follows, user input of file names, selection of a file to load, system error trapping, action selections and so on. A dialog box can be activated at any time without affecting the state of the application software that it was activated by, it effectively freezes the machine with only a few variable exceptions. Locations $02 to $20 and the screen under the dialog box are not however preserved. Yet again the

Command

BYTE	EXAMPLE	DESCRIPTION
1	.command byte .byte xpos in bytes .byte ypos in pixels	Display OK system icon at position specified.
2	.command byte .byte xpos in bytes .byte ypos in pixels	Display CANCEL system icon at position specified.
3	.command byte .byte xpos in bytes .byte ypos in pixels	Display YES system icon at position specified.
4	.command byte .byte xpos in bytes .byte ypos in pixels	Display NO icon at position specified.
5	.command byte .byte xpos in bytes .byte ypos in pixels	Display OPEN icon at position specified.
6	.command byte .byte xpos in bytes .byte ypos in pixels	Display DISK icon at position specified.
7	.command byte .byte xpos in bytes .byte ypos in pixels	Display FUTURE 1 icon at position specified.
8	.command byte .byte xpos in bytes .byte ypos in pixels	Display FUTURE 2 icon at position specified.

9	.command byte .byte xpos in bytes .byte ypos in pixels	Display FUTURE 3 icon at position specified.
10	.command byte .byte xpos in bytes .byte ypos in pixels	Display FUTURE 4 icon at position specified.
11	.command byte .byte xpos offset right .byte ypos offset down .word pointer to string	Display test pointed to word at location x pixels from left of DB and y pixels from top of DB.
12	.command byte .byte xpos offset right .byte ypos offset down .byte $0c-$16, $1e. num of reg	As above but with text string location in reg.
13	.command byte .byte xpos offset .byte ypos offset .byte reg pointer for $0-c-$16 .byte max number of chars	Store a text string entered by user in location pointed to by reg. X and Y pos for entry as above with max number of chars.
14	.command byte	Cause return to application whenever mouse is pressed in off icon position.
15	.command byte .word pointer to graphic string	Display graphic string
16	.command byte .byte xpos offset 0-39 -byte ypos offset 0-199 $10 GEOS file type $0C-$0D file name buffer $16-$17 pointer to permtname	Display the filename box inside the dialog box, wide and y tall. When a file is selected by the user it's filename is copied into the buffer pointed to by $0C If $16 is not zero it points to a string which contains file permanent name. This is how GEOpaint displays only paint files for selection.
17	.command byte .word user off icon press	GEOS will enable a jsr to a routine pointed to by the word whenever the mouse is pressed off the dialog box.
18	.command byte (user icon) .byte x offset .byte y offset .word pointer to user icon info USER ICON INFO TABLE .word pointer to graphics data .byte 0 .byte 0 .byte 6 .byte 16 .word service routine call address	User defined icon using extra user icon info table shown below. When activated the service routine is called. Don't forget to end with call to RstrFrmDialog.
19	.command byte .pointer to user routine	Allows just about anything to be done in the dialog box by the user routine, an RTS will return to dialog box code.

Berkeley designers of GEOS have used the simple table method for controlling dialog boxes and have also provided ten built in dialog box icons. There are just two routines in the GEOS kernal associated with dialog boxes, the first called DoDlgBox at $C256 is called by an application to display a dialog box with registers $02-$03 pointing to the dialog box definition table. The second routine called RstrFrmDialog at $C2BF is called from any of the dialog box service routines to return back to the application. If a built in icon is used, operation of this icon will cause an automatic call to RstrFrmDialog, the code for the icon pressed will be returned in $02.

The dialog box table uses a series of command bytes followed by optional data bytes to control the dialog box. The first command is the dialog box position command and tells GEOS to either place the box in the default position in which case no further data bytes follow, or to use the user position defined in the following six data bytes. (top, bottom, left, right in pixels) If the MSB of this byte is set GEOS will use the default position, if not it will use the user defined position. The remaining bits of this byte are used to describe the shadow pattern to be used, if none of these bits are set then no shadow will be produced. Following this are various other command bytes and their related data bytes to describe the contents and layout of the dialog box and some special functions. The dialog box table must always end with a null byte.

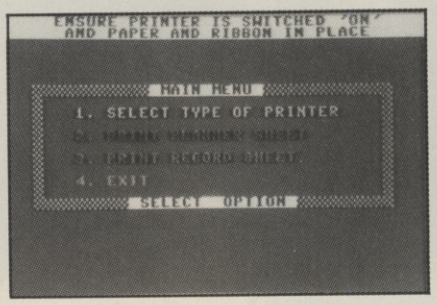
I shall now describe each of the available command bytes and what data bytes must follow them.

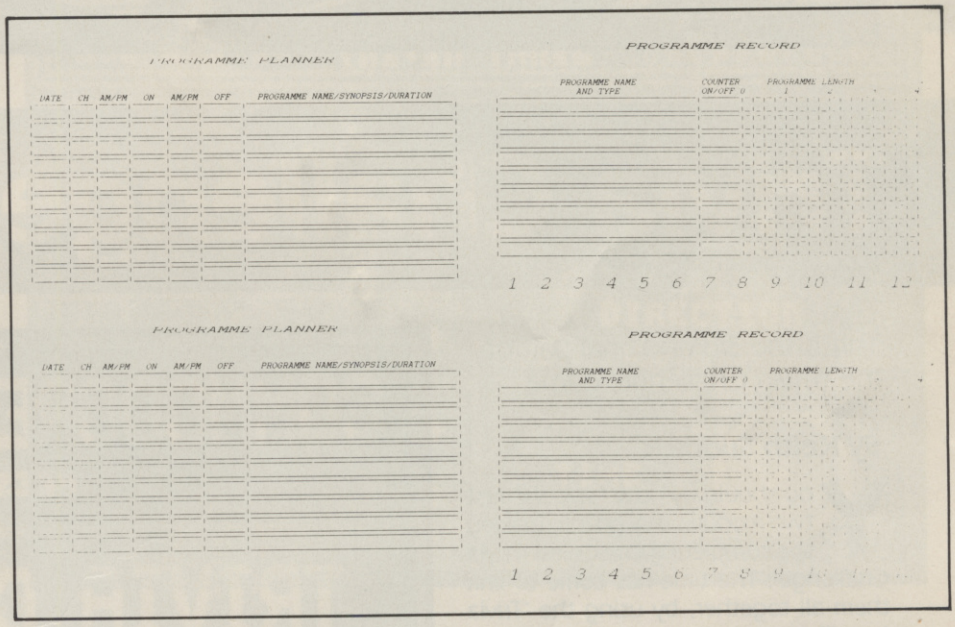
If you stick to using the built in icons like yes and no or quit, then the use of dialog boxes can be extremely simple, requiring a call and a simple command table. All you need to do after an icon has been selected is to check the register $02 to see which icon it was. If you use your own service routine you must load $851D with a value of greater than 8 before calling RstrFrmDialog, this is so that register $02 will contain this number when it returns, preventing your application thinking it was one of the other 8 possible icons that was activated. Well that about wraps it up, so don't stop here, have a go and see if you can come up with your own GEOS application. Good luck!

Video Recorder Planner

Keep track of your intended recording session the easy way with this planning program

By R. Davey




PROGRAMME PLANNER
DATE CH AM/PM ON AM/PM OFF PROGRAMME NAME/SYNOPSIS/DURATION
PROGRAMME RECORD
PROGRAMME NAME AND TYPE
COUNTER ON/OFF 0
PROGRAMME LENGTH
1 2 3 4 5 6 7 8 9 10 11 12
PROGRAMME PLANNER
DATE CH AM/PM ON AM/PM OFF PROGRAMME NAME/SYNOPSIS/DURATION
PROGRAMME RECORD
PROGRAMME NAME AND TYPE
COUNTER ON/OFF 0
PROGRAMME LENGTH
1 2 3 4 5 6 7 8 9

Before you use this program make sure you have at least the following set-up. A C64 or C128 computer. Disk Drive and compatible printer. (Although you must have a disk drive why else buy CDU).

Many households have a Video Recorder and use it to record TV programmes to be seen at a later date and a notebook is used to enter programme details.

Now with this simple program you can use your listing paper to give you as many forms as you wish, to keep your planned viewing in neat order. For economy in the use of paper the length of the forms are such that two forms can be printed on one sheet of listing paper.

The forms, when produced, could be stored in a ring binder or on a clip board or in plastic envelopes.

If you are using the Star Colour Printer then you have a choice of colours for the headings. This programme uses Green for the Planner and Red for the Record sheet, BLACK is used for the body of the forms as too much colour might spoil the effect.

The Print Pitch and Style can be changed to suit your fancy. I have used PICA Pitch and COURIER/ITALIC Style print. If you use a greater number of letters to the inch the form will be smaller because the printing will be condensed.

If you do not have a colour printer the program can still be used and will produce the forms in normal black print.

There are two formats:-

1. A Programme Planner

For writing details of the programme ie. Times 'on' and 'off' etc which can be copied from the Newspaper or TV/Radio Times together with a brief description of the programme. This can then be easily read and transferred to the Video Recorder in the correct sequence.

This format is for use with the Hitachi Video Recorder but the format can easily be changed by listing the program and altering the applicable lines under the REM heading. Keep the total width of the format to that of this listing if your paper size is 9.5"*11". The number of entry lines can be varied by listing and changing the 10 to any number to suit your requirements and paper length.

2. A Programme Record

For recording the type and length of the programme. At the bottom of the sheet are the numbes 1 to 12. This represents the Video Tape number and one of these sheets should be allocated to each tape. If you have more than 12 Tapes and to produce a sheet to suit your tapes change the number '1 to 12' in the listing to '13 to 24' or to the numbers to suit your tapes. This number can be varied in size and as this program was written for the Star printer it is twice the height of that of the Commodore printer.

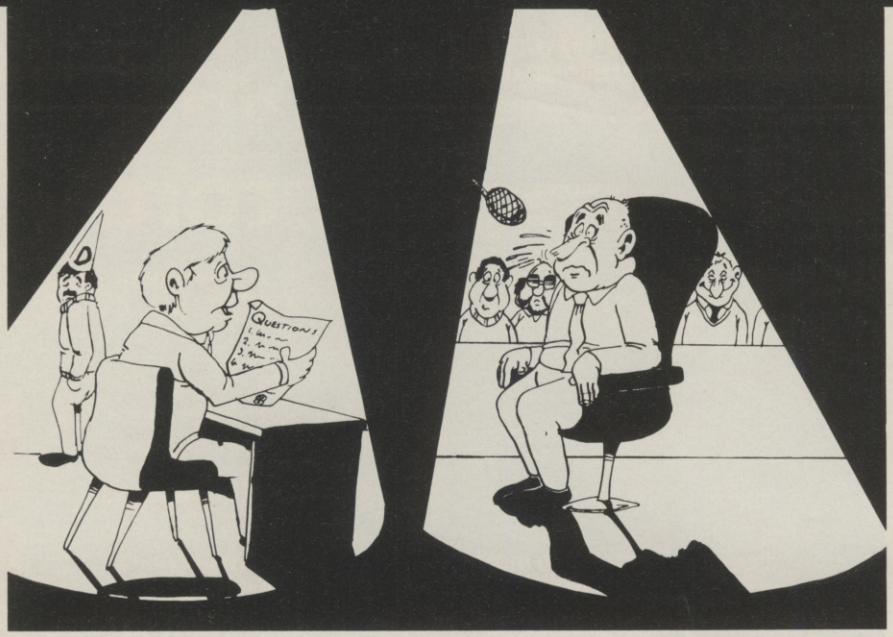
Because of this height difference this format has one less line than the Programme planner. The Printer Handbook will explain the procedure for obtaining variations in printing if you so need.

The format can be changed as for the Planner Sheet. (Note there are only 9 lines in the Programme Record).

This progam allows for the use of a colour printer but if you do not have such a printer then reference to the colour printer could be deleted from the listing or it could be retained, just in case you need it later on.

If, after printing a Planner sheet and you want to print a Record sheet you do not need to go through the printer type selection in the Main Menu; just select 'Print Record Sheet' and the print-out will be in the same printer mode. After printing a Record sheet more sheets are required, the program will ask you to reset your printer, this is because double printing has been selected and the printer has to be reset.

If on start up you do not go through the Printer Type selection the print-out will be in the Commodore format.



Trivia Challenge – Part 3

This is the 3rd and final part of the 'Trivia Challenge' game

By Keith Suddick

You should by now have the first two modules that go into making the complete game called 'Trivia Challenge'. The time has come to link them all together, by using the 'Trivia Install' program. Follow the instructions at the end of this article for making the final program.

If you know how many golf balls are on the moon or which English King had a tattoo then you might well be an expert on trivia – so have a go at **Trivia Challenge,** you might learn something absolutely useless!

Trivia Challenge is a game in which there are over two thousand questions, mostly on quite useless facts. Answering questions correctly earns points which, at the end of a game will be converted into a code, which along with the score may be used to enter the **Commodore Disk User Trivia Challenge** competition.

There are three rounds in the game, which repeat and get more difficult as the game progresses.

The first of the three rounds is called *tic-tac-trivia* – a simple(!) game of noughts and crosses, in which the player lays down crosses against the computer, playing as noughts. The players alternatively select a square and the player is asked a question. A correct answer puts a cross in the square, a wrong answer puts a nought. Three crosses in a row and the player wins, three noughts and the computer wins and the game ends. In the event of no winning (or losing) lines then the numbers of each symbol are totalled and the greater one wins.

The clock on the tic-tac screen shows the time available to choose a square – the SPACE BAR is used to move a cursor to the required square and the RETURN key will play that square.

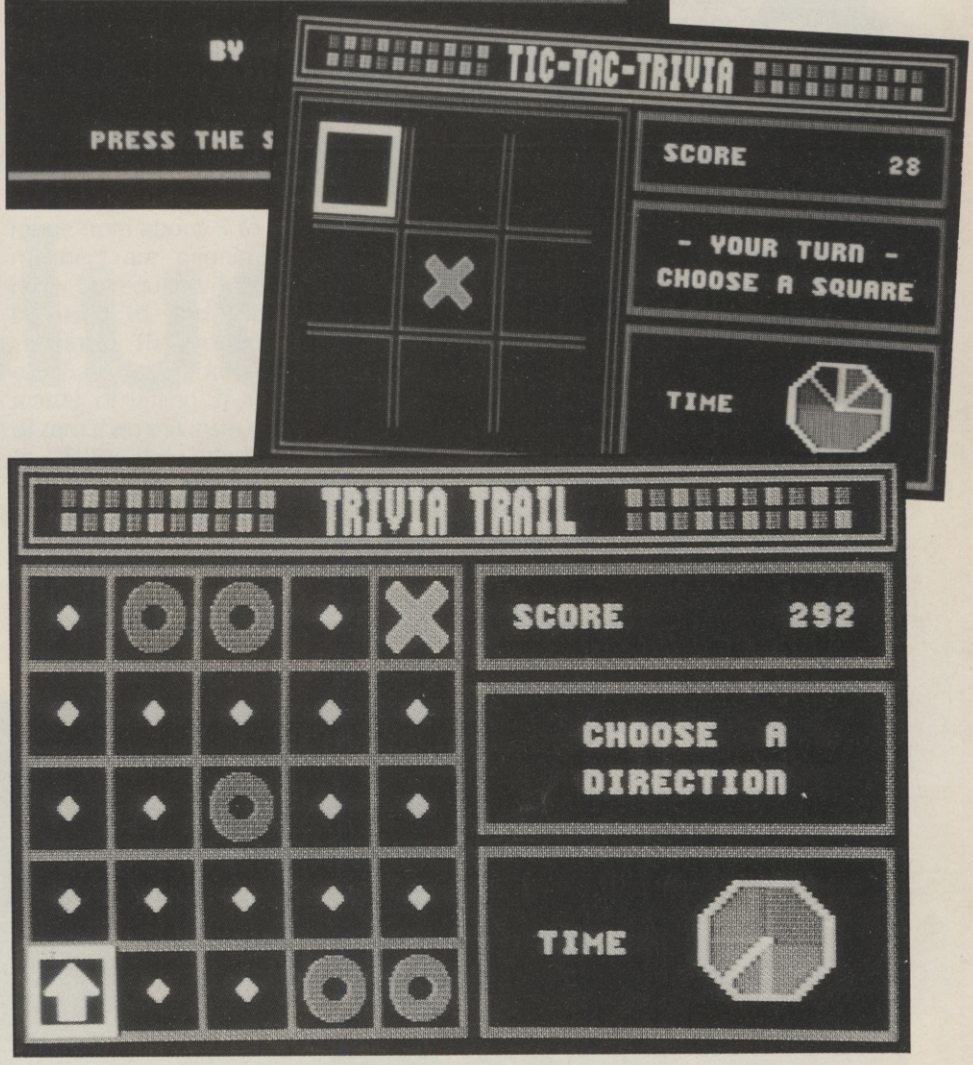
Success at noughts and crosses leads to round two which is called *trivia trail* and is played on a 5x5 grid. The player starts in the lower left hand corner of the grid and must move to the upper right hand corner, which is marked with a cross. Each move is earned by correctly answering a question, after which an arrow will appear and can be changed by pressing the SPACE BAR to select the required direction, then the RETURN key to make the move.

At the start of this round, each square on the board contains either a diamond marker, each of which are worth ten points when landed on, or a bonus marker (a nought) which carries extra points, or free moves or a clock reset when landed on for a second time.

The clock on the trivia trail screen shows the time available for the entire game. There is a time penalty for any wrong answers. The players can only win by getting to the "cross" and loses only by time out.

COMMODORE DISK USER
PRESENTS

TRIVIA CHALLENGE



The last of the three rounds is called *trivia flash* and is simply a rapid sequence of questions – 2 for each time through the three rounds. There is no time limit but ALL the questions have to be answered correctly or the game will end. After "trivia flash" the game returns to "tic-tac-trivia" and so on but it will be slightly more difficult each time around.

When the questions are displayed, four possible answers are always shown, only one is correct. The keys 1 to 4 OR the four functions keys may be used to select an answer. A clock is also shown at the bottom of the screen and starts with 25 time units shown, a correct answer will earn 4 points for each time unit remaining when the key is pressed – time out will end the game.

As already mentioned, when the game ends a competition code will be shown along with the final score, BOTH the score and code are required to enter the competition, so if you wish to enter, copy them down carefully – they will only be shown on the screen for a limited time so have a pen and paper ready.

As should become obvious, the disk needs to remain in the drive throughout the game, so it only remains to say Good Luck!

About the Competition

CDU in conjunction with the author, challenge you all to enter to better my score.

Once we have published all 3 parts of Trivia Challenge and you have linked them together to form the game (see Getting It In), you will have a chance to pick up a colour monitor for your C64. At the end of this article you will see a competition score sheet. Simply fill out the details and send your entry to:-

Trivia Challenge,
CDU,
Argus House,
Boundary Way,
Hemel Hempstead,
HP2 7ST.

Closing date for the competition will be **30th June 1990**. (This should give our Australian readers a fair crack of the whip!!!). Only one entry per person will be allowed. Employees of Argus Specialist Publications and their relatives are exempt from the competition.

Getting It In

Have a blank formatted disk ready. Load and run the Trivia Install program from any of the three pat issues and follow the on screen prompts.

Note: Due to the way the program is saved out in the final version, you will not be able to load and see the directory. In order to run the final version simply put the disk in the drive and type **LOAD "TRIVIA", 8,1**

COMMODORE DISK USER TRIVIA CHALLENGE

NAME _____

ADDRESS _____

_____

_____

_____

SCORE

COMPETITION CODE

PLEASE USE BLOCK CAPITALS

Screen Manipulator

Getting the screen borders to disappear isn't as difficult as you might think

By Jason Finch

With the aid of Raster Scan Graphics (obtained by controlling a line that scans the screen many times every second) it is possible to achieve a variety of visual effects ranging from smooth scrolling screens to spectacular games displays.

Many programmers prefer to leave a border of some kind or another around the entire screen although a few games, such as 'Revenge of the Mutant Camels 2', display a more arcade-game style of background – one that occupies the full length of the display with just two block strips down either side.

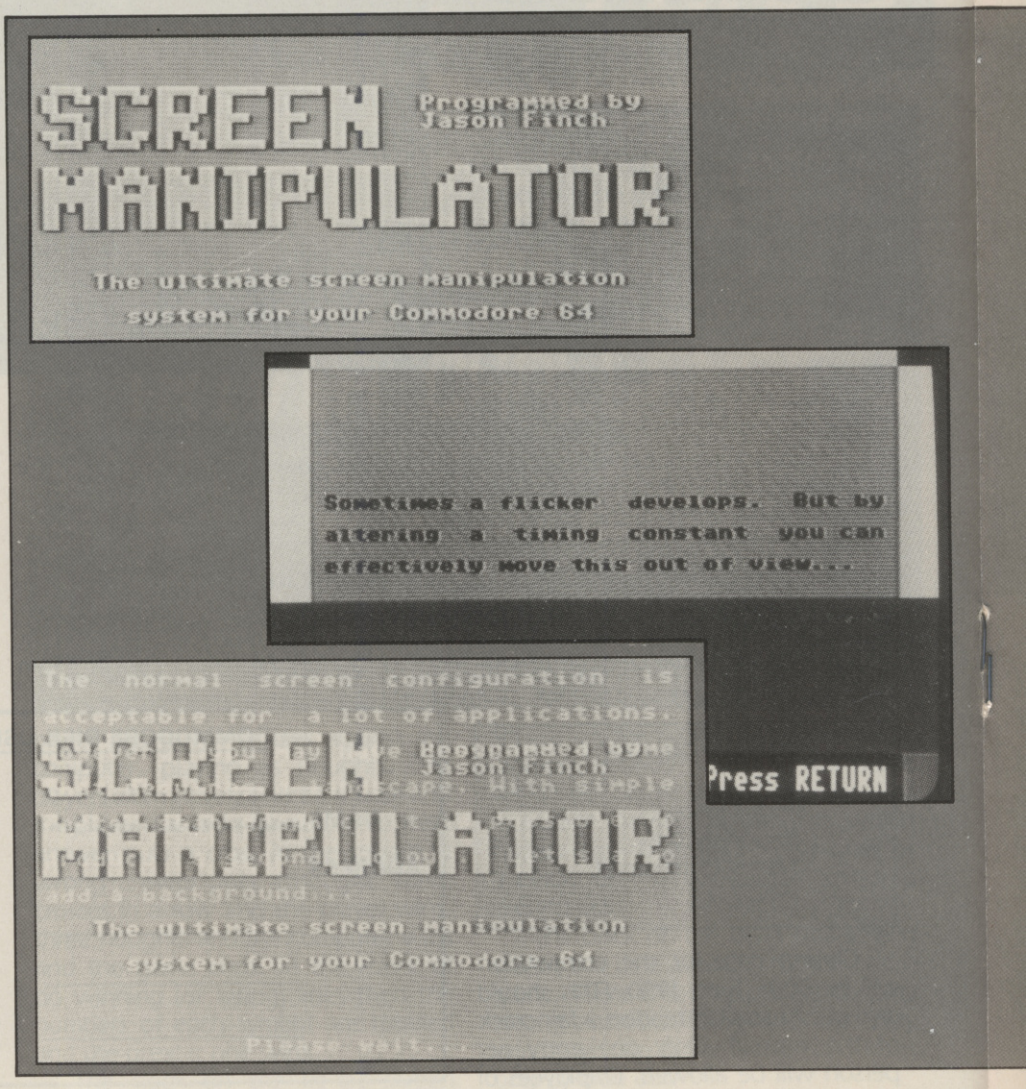
At some stage or another the majority of people will have seen a game or program that creates such a display and wondered how on earth it is possible to eliminate part of the upper and/or lower borders. The technique is, however, surprisingly simple to achieve so long as you have a knowledge of machine code and the operation of Raster Scan Graphics.

The method lies in a bug in the Video Interface Chip (VIC for short) whereby a simple 'OR' at the right time fools the computer into converting the upper and lower borders to background – thus allowing the 'background' colour to stretch the full length of the screen and indeed sprites to be displayed in the upper and lower border regions.

Getting the computer to 'release' the left – and right-hand borders is slightly more tricky although still relies on only six key bytes. However, there are many drawbacks with this which I hope to discuss in the future.

The program on the disk will allow you to achieve the long screen effect and many more very easily indeed. The main code resides at 49152 onwards although with the help of the accompanying BASIC program it can be relocated virtually anywhere in the memory. There is also the option of saving to your own disk and having the code autobook with your selected colours.

The code splits the display vertically



into four. Each section can have a different border and background colour. The four regions are defined as follows: from the very top of the display to the top of the usual background; from there to a point defined by the user and lying within the usual background; from that point to the bottom of the usual background; and then from there to the very bottom of the display. To manipulate these there are four main 'commands' that are accessed through a BASIC 'SYS' call.

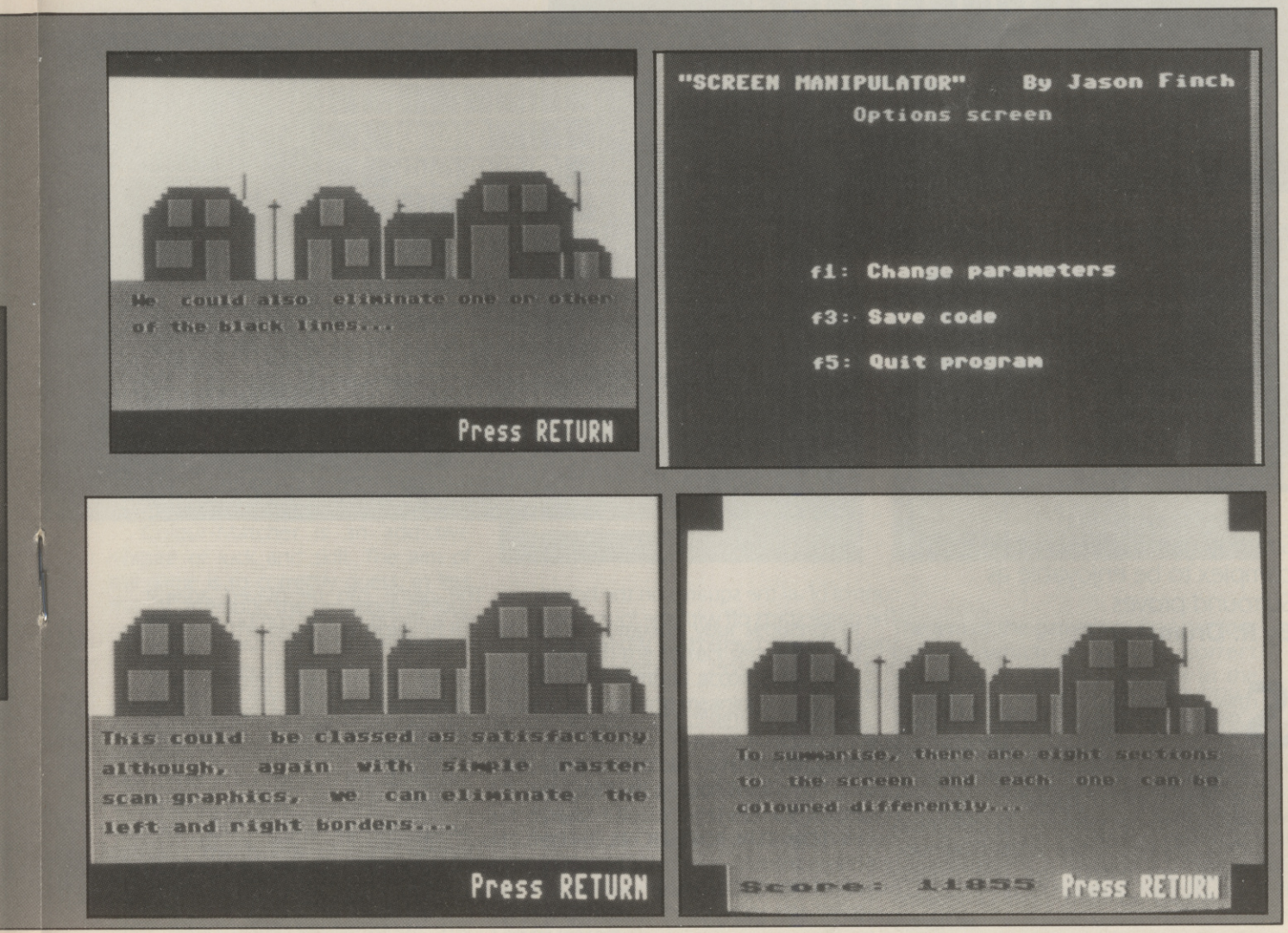
SYS49152 initiates the interrupts to create the effects. SYS49155 switches them off. This should be done before any Input/Output devices are accessed. The border and background configuration will revert back to normal, though the colours may be unpredictable.

SYS49158,R,C changes region R to colour C, where 'R' lies between 1 and 8, and 'C' between 0 and 15. With the latter any higher numbers are treated modulo 16. If 'R' takes a value of 9 then 'C' represents a 'fine tuning' constant. The user-definable split (see the demo if you are unsure of what this is) has a range of 120 pixels vertically. Depending upon where it lies you may get a flicker appearing. Values of 'C' should range from about 3 to 15. Any higher numbers are permitted but should never be required. Trial-and-error must be used to find this 'fine tuning' constant. The correct number will eliminate any flicker – it is simply a matter of timing. If 'R' takes a value of zero then this instructs the computer to change the vertical position of the user-definable split and 'C' indicates the position. It must lie between 0 and 119, a value of zero giving a split about three lines into the normal background.

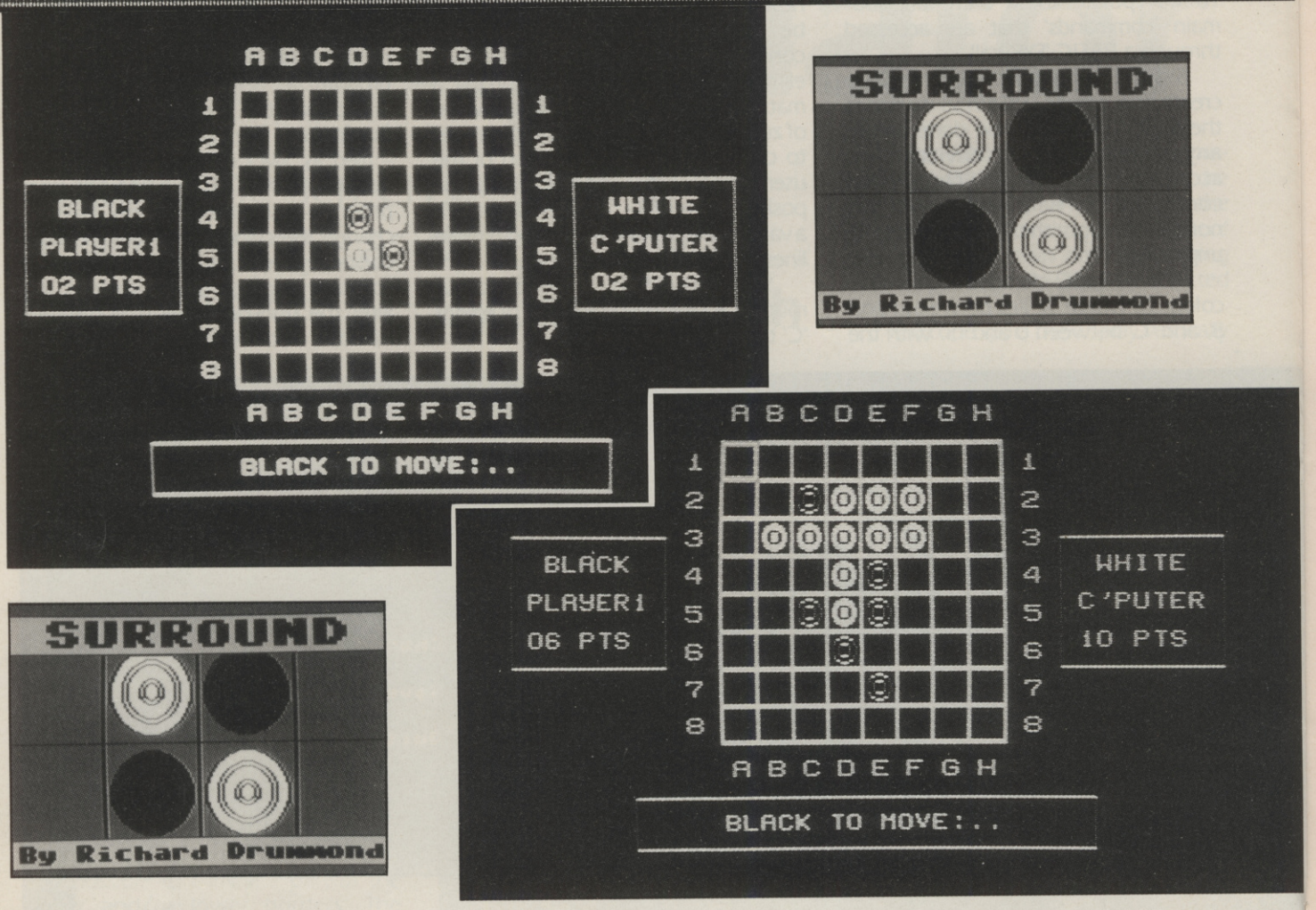
SYS49161,C,S is a swap colour routine. It changes all regions of colour 'C' to colour 'S'.

As I mentioned earlier, sprites can be displayed anywhere vertically. Due to the effect being created by a bug, you may experience black lines appearing in the border. POKE16383,0 will get rid of them. If incorporating the effects created by 'Screen Manipulator' in your own programs you must ensure that location 16383 (the last address of the 16K block that the computer 'sees' on power-up) always contains a zero. This should not create too many problems unless you have a long BASIC program.

To load the program select screen manipulator from the menu. The code – filed as 'SM CODE' – will then load automatically. In this introductory program use the function keys to change the colours. The left and right cursor keys will change the 'fine tuning' constant and the up/down keys will alter the user-definable split position. All other instructions are included.


He could also eliminate one or other of the black lines...
Press RETURN
"SCREEN MANIPULATOR" By Jason Finch
Options screen
f1: Change parameters
f3: Save code
f5: Quit program
This could be classed as satisfactory although, again with simple raster scan graphics, we can eliminate the left and right borders...
Press RETURN
To summarise, there are eight sections to the screen and each one can be coloured differently...
Score: 11855 Press RETURN

SURROUND



Strategy games need not be complex to be enjoyable as Surround proves

By R. Drummond

Surround was inspired by that early 19th century English game called 'Reversi'. The game is played on a normal chess board, and each player has 32 counters or discs. Normally Black and White are used, although they can be any two colours. The object of the game is to capture as many of your opponents pieces as possible. Ultimately, you want to gain control of all the squares on the board. The game starts off with the four centre squares being covered by 2 White pieces and 2 Black pieces, at diagonals to themselves.

The idea is simple, on your move, you must place a piece next to one of the opponent's pieces thus entrapping it. This piece will then turn to your colour. It is permissable to capture more than one man in a move. Should an unbroken line of two or more opposing men be flanked in a move, then all are captured and their colour reversed.

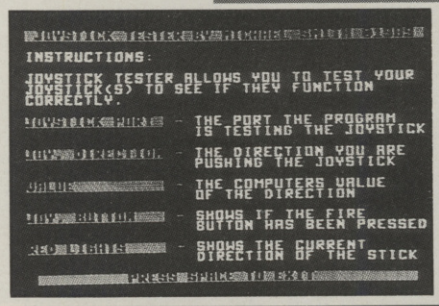
The game can be played against either a friend or the computer. Press F1 on the title screen to change player options. The computer player has three levels of intelligence which can be selected by pressing F3. After both of these options have been finished with press RETURN.

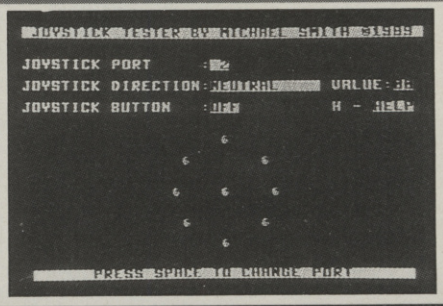
To select where to place your piece, control the cursor with a joystick in port two. Alternatively, type in the co-ordinates of the square, (eg: A7,G1) followed by return. If you cannot move, press F1 to forfeit.

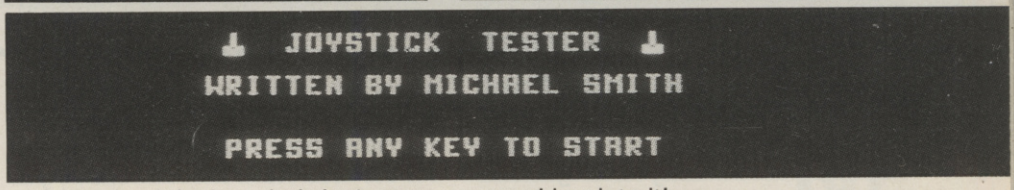
Joystick Tester

An easy to use diagnostic check on the functioning of your Joystick(s)

By M. Smith


INSTRUCTIONS:
JOYSTICK TESTER ALLOWS YOU TO TEST YOUR JOYSTICK(S) TO SEE IF THEY FUNCTION CORRECTLY.
- THE PORT THE PROGRAM IS TESTING THE JOYSTICK
- THE DIRECTION YOU ARE PUSHING THE JOYSTICK
- THE COMPUTERS VALUE OF THE DIRECTION
- SHOWS IF THE FIRE BUTTON HAS BEEN PRESSED
- SHOWS THE CURRENT DIRECTION OF THE STICK





Most computer stores have joystick testers in the form of a black box with eight LEDs in the pattern of directions (N,E,S,W,NE etc). There is another LED set in the middle of the others, this one is for the fire button. On seeing one of these I thought it would come in handy. On discovering how much one of these would cost to make, I quickly went off the idea! Just to give you a rough idea, in one shop, just the box cost seven pound's! After that I came up with the idea of making one on my C64.

I have inserted a few lines so the user can make the program switch between the two joystick ports, which would come in handy as you would have to keep un-plugging if you were testing two joysticks.

I have also included a customised character set especially for the program which makes it look a whole lot better.

Since making the program I have used it no end of times for finding the faults with joysticks. It is also useful for testing the response of the joystick. I thought it would be a good idea if I passed on the program to all you readers so it could help to see if your joystick is faulty before plunging a screwdriver into it!

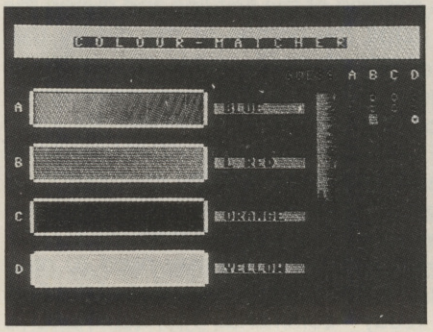
NOTE: If you hold down the fire button and push into a direction and then let go of the button, the fire button light will still be on.

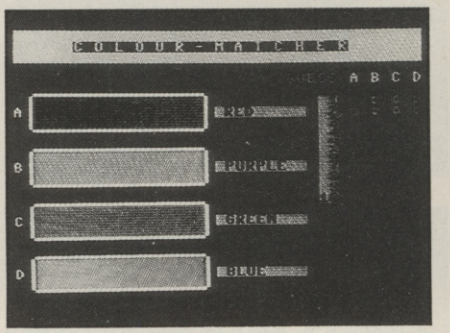
You also cannot move the stick in any direction and then press the fire button as the fire button indicator will not light up.

Colour Matcher

Another version of the old guess the sequence game hits the streets. This one is for the younger players

By M. Hinam





There have been many adaptations to the 'Mastermind' peg game over the past few years. CDU's own LOGIC is one such variant. I decided to do my own version which woud be more suitable for the younger player.

Colour-Matcher is an addictive mixture of luck and skill. The aim of the game is to correctly guess, in less than 11 attempts, the sequence of four colours that the computer holds in its memory.

Once started, the screen display shows four boxes, labelled A,B,C and D. The colour of each box can be changed by pressing the appropriate key, either A,B,C or D. If the space bar is pressed a row of four symbols appears next to the current guess number. The colour of each symbol matches the current colour of that box (of course a black symbol cannot be seen against the background). The computer compares your sequence of colours with the correct sequence and displays the symbols accordingly. They have the following meanings:

AN OPEN CIRCLE - THAT COLOUR IS NOT IN THE SEQUENCE
A SOLID CIRCLE - THAT COLOUR IS IN THE SEQUENCE BUT NOT IN THIS POSITION
A SQUARE - THAT COLOUR IS IN ITS CORRECT POSITION IN THE SEQUENCE

The aim of the game is to find the four colours which make the correct sequence, ie. get four squares in the guesses column. This can be done with both luck and skill, by using information from previous guesses.

If you find all four colours a winners message is flashed up and you are prompted for another go. If you use your ten guesses without finding all the colours you are shown the correct colours. G must then be pressed to continue.

Obtain smooth vertical screen slides with this handy utility

By Jason Finch

Screen Slider

Many of you will have undoubtedly seen games or programs that scroll a screen vertically extremely smoothly indeed. These screens can range from simple one colour text screens to multicolour bitmapped pictures.

Screen Slider was produced to compliment the other raster utilities that I have presented in Commodore Disk User in the past. It allows the effect described in the opening paragraph to be created with ease by the BASIC programmer although the code can easily be adapted by anyone wanting to call the routines from within their own machine code programs.

By using a set of three simple "commands" you can scroll the screen either up or down without any flicker or uncontinuous motion whatsoever and you can also set the speed at which the scroll occurs. You must realise that the utility is not one allowing continuous vertical scrolling of a landscape or other such background as seen on games like those created with the "Shoot-'Em-Up Construction Kit". The routines enable single screens to be scrolled into the main display area and rely on the fact that you can shift the screen up or down by one pixel by altering the contents of location 53265 ($D011). By doing this on each individual line of the screen you can build up a cumulative shifting effect. The number of times you repeat this determines the vertical position of the screen. Of course, as with all raster-scan routines, this is performed many times every second to keep the screen at the correct vertical height. A counter is then incremented and the loop repeated one more time, thus moving the screen down (or up) a further pixel.

That should have cleared up most of the technical information but if you want to start giving things titles, then the correct terminology is Flexible Line Distancing. There are two main routines which can be summarised as follows: a "get ready" routine and one that initiates the actual slide. It is important to understand that with an upward motion we are considering moving a non-visible screen upwards to fill the display and not a displayed screen moving vertically out of the top of the display. Also, the screen that you are sliding is, in theory, always visible in its entirety (what??). It's true and must be remembered – the slide is simply obtained by varying the vertical position of the first line and during the scroll the portion of the display that is not physically visible can simply be thought of as being concealed by the lower border. This allows for even complicated screens such as bitmapped pictures to be scrolled as smoothly as you could ever wish!

I shall describe the initiation command first as you may need to refer to it during the explanation of the "get ready" command. The command is given using a standard SYS call from BASIC and takes the following form: SYS 49155,z. This will start the slide and the 'z' represents a numeric value – either a zero or a one – instructing the computer as to what it should do during the scroll. If 'z' takes a value of zero, the routine will return to BASIC immediately the scroll begins. Although it will finish automatically you will be required to check the contents of location 2 from your program to find out whether the scroll is complete. It may be obvious visually but your program can't actually "see" the screen. This return to BASIC during the scroll allows you to continue any animation of sprites etc from BASIC whilst the screen is moving. PEEKing location two will return a value of 255 if the scroll is complete. By using a parameter of one in the command, the routine will perform its own checks, not returning control to BASIC until the slide has finished.

However, before the scroll can be initiated it must be prepared for – just like good cooks weigh out all their ingredients before starting to make the mix. The command for this will set up the main interrupts (these are what allow the slides to take place in the way that they do) and will also contract the display from 25 to 24 rows vertically. If this is not done, then the characters or whatever is moving into the display or out of it will suddenly appear (or disappear) at the bottom of the screen which will seem unnatural.

The command needs up to two parameters and takes the form SYS 49152,x,y. 'x' and 'y' are again numeric values. The value of 'x' governs the direction of the proposed scroll. A zero will, however, disengage any interrupts that may have been set up (this simply means it does the opposite to the main function of the command). The size of the screen (24 or 25 rows) will be selected depending upon the parameter specified in the last command, detailed later on.

A value of one specifies an upward slide. As soon as this command, with a one, has been given, the main screen will move out of the display area and the border colour will fill the normal background. It is at this point that you should begin to display the screen you want to scroll. Simply PRINT it to the

screen as usual or transfer to bitmap mode – whatever your needs are. If you do the latter before issuing the command, then your screen will be visible for a split-second prior to it being scrolled which will seem unnatural.

A two for the first parameter gets the computer ready for a downward scroll. The normal display will remain where it is vertically and therefore the only apparent change will be the "shrinking" of the screen to 24 rows.

During both forms of the slide you will notice that the border seems to stretch downwards (or go upwards) with the movement of the screen. This gives a better general impression although may be omitted by adding 128 to the parameter value (129 for upward, 130 for downward).

The second parameter of the command is an "after-effect" indicator and will only work if your proposed scroll does not return to BASIC immediately. If you intend to do the latter then assign a zero to this parameter. Otherwise, a zero will switch off the machine code interrupts that control the slide once it has finished. This should not be done after a downward scroll in the opposite direction allowing a subsequent scroll to be issued without preparing for it again. Should you want to return to BASIC immediately the slide begins, simply perform whichever command you want by using the standard forms of the desired command.

The final command is the one that allows you to determine the speed at which the next and subsequent scrolls will take place. It also defines the size of the screen after the interrupts are disabled. It therefore takes two parameters and the form SYS49158,a,b. 'a' represents a numeric value from 1 to 8 inclusive. This is the speed, with 1 being the slowest and 8 the fastest. The second parameter 'b' can take one of only two values – 24 or 25. This is the actual number of rows that will be displayed on the screen after all interrupts are turned off with the SYS49152,0 command. The default values upon loading are speed one and 24 rows.

That finally clears up the operating instructions but now there are a few matters of logic. First and foremost, the SYS 49155 command to initiate the scroll cannot be called when no interrupts are enabled (and so there is no proposed scroll). If you do this then a Syntax Error will be generated. One will also be created if you attempt to prepare for a new scroll whilst one is in progress.

Another very important point is the contents of location 16383. If using bank 0 (which you will be doing if you have not changed it since power up) then it is vital that you store a value of zero at this location – POKE16383,0. This is due to the effect exploiting a bug in the computer's Video Interface Chip and should not cause any problems unless you have a large BASIC program that occupies that particular part of memory. If this is so, you will have to change the bank number and where the computer "looks" for screen and character information. Then the location that should contain a zero is the last in that block of 16K that the computer is reading (ie Bank 2 is 32768-49151. Therefore POKE 49151,0)). the only other alternative is to set the background colour black – the lines that usually appear will then not be visible.

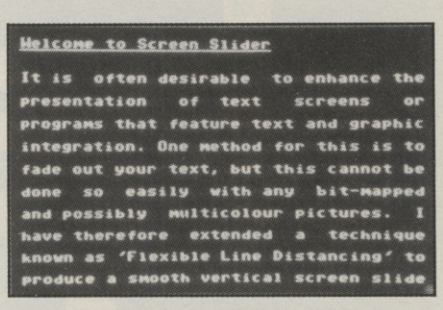
Summary

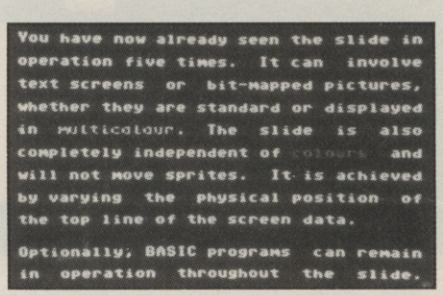
SYS49152,x,y will either switch off the interrupts or prepare for a scroll in direction 'x' with 'y' indicating the after effect. SYS49155,z begins the proposed scroll in the pre-defined direction. 'z' indicates whether control is returned to BASIC where a zero does so immediately and renders parameter 'y' insignificant, having no effect. SYS49158,a,b sets the speed ('a') of future scrolls and 'b' defines the number of rows after interrupts are switched off, either 24 or 25.

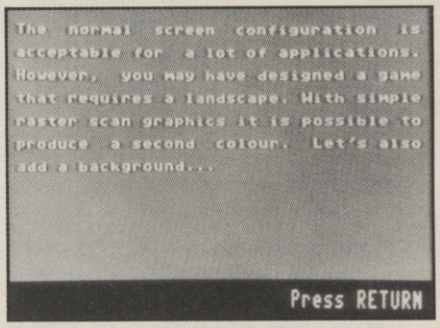
Also, the interrupts need not be disabled between subsequent slides. Once a scroll is prepared, a different one can be prepared or the interrupts can be terminated without that scroll having taken place.

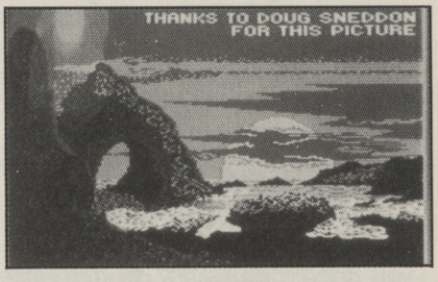
Loading

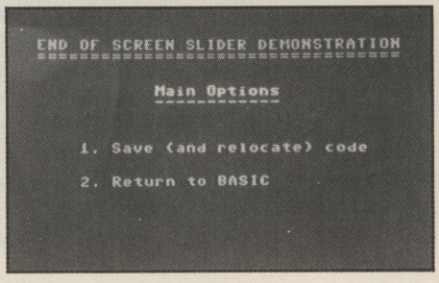
Select the program named "SLIDER CODE" from the main menu. There is also a demonstration file provided so as to illustrate what is possible. This can be loaded by typing LOAD "SS DEMO",8 and then RUN. I should, at this stage, thank Doug Sneddon of Wiltshire for the bitmapped picture that accompanies the demo. Once it has finished, you will have the option of relocating the code and saving it to your own disk.


Welcome to Screen Slider
It is often desirable to enhance the presentation of text screens or programs that feature text and graphic integration. One method for this is to fade out your text, but this cannot be done so easily with any bit-mapped and possibly multicolour pictures. I have therefore extended a technique known as 'Flexible Line Distancing' to produce a smooth vertical screen slide


You have now already seen the slide in operation five times. It can involve text screens or bit-mapped pictures, whether they are standard or displayed in multicolour. The slide is also completely independent of colours and will not move sprites. It is achieved by varying the physical position of the top line of the screen data.
Optionally, BASIC programs can remain in operation throughout the slide.


The normal screen configuration is acceptable for a lot of applications. However, you may have designed a game that requires a landscape. With simple raster scan graphics it is possible to produce a second colour. Let's also add a background...
Press RETURN





All in the mind

Your Brain is a fantastic concept, so why do we only use about 15 per cent of its capabilities?
By Andy Partridge

"You're on the road to success when you realise that failure is merely a detour." – WILLIAM G. MILNES JR.

How many times have you been bashing your head against a wall, desperately trying to reach a goal that lies just a few feet away from you, yet it always stays that few feet away from you? Many times, I can safely say.

How many times have you tried your hardest to reach a solution to a problem, but not found one?

And finally, how many times have you tried desperately to remember something, with no success, only to find that some time later the idea just "Pops" into your head, when you are not expecting it, and certainly far too late for the information to be of any use?

I have an answer to all this! Read on...

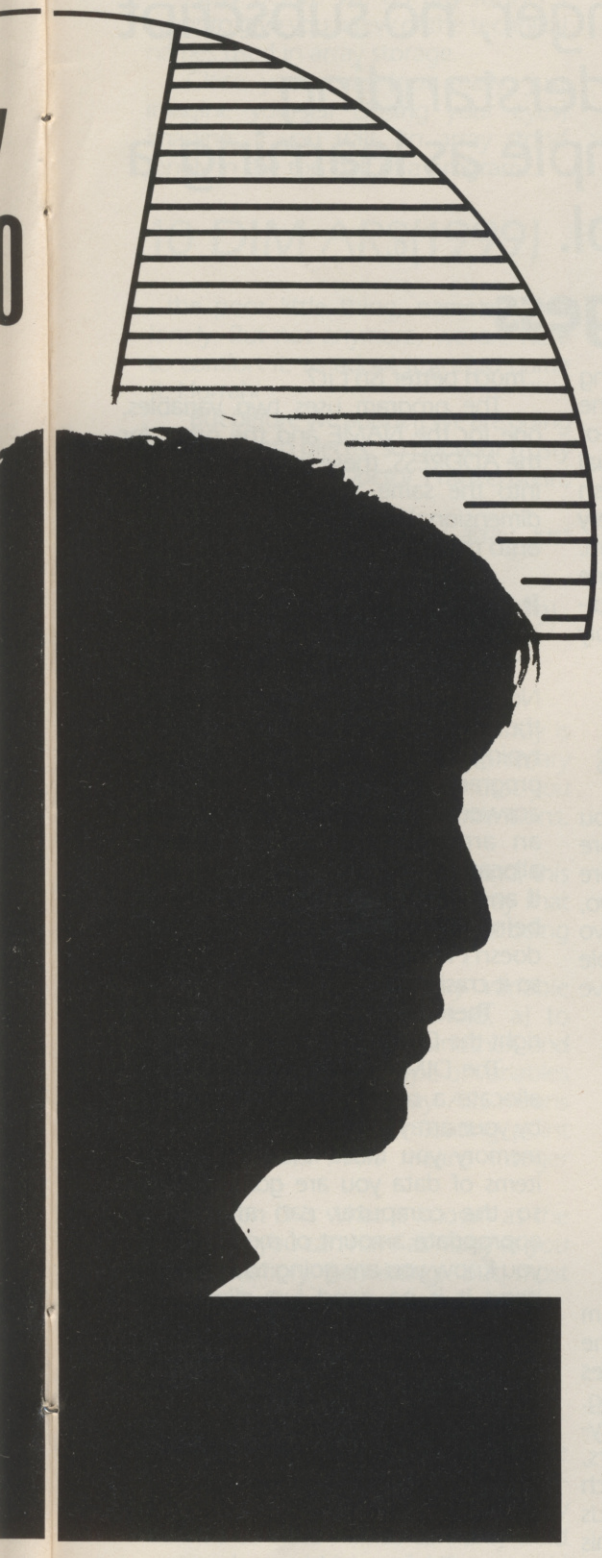
Your mind. It's big. And most of the population of this planet only uses 15 per cent of it during their brief time on this Earth. And why? Because they don't realise that the other 86 per cent exists! Well, now I'm telling you. It's there. And it's called the UNCONSCIOUS MIND. And it is NEVER wrong.

All of you have experienced that sudden burst of inspiration that gives us a foolproof idea on how to achieve something, and that's what the unconscious mind does. It provides us with foolproof ideas. What you need to do on your route to being a better problem solver is learn how to tap the unconscious mind and stir it into action to solve any and every problem you have in your life.

PART 1 – Silence, Stillness and SLEEP!!

Those three words are the most important part of this section. If you are to learn how to tap your 86 per cent of wasted Mind Power, you have to learn to meditate. This is where most of you are going to think "Meditate? What a load of rubbish!" That's what I used to think, but consider this:

In African Cultures, Black Dancers can train their mind to ignore pain, and they can stick needles through their ears, mouth and nose, and can walk across hot ashes, with no burning or pain. They do this by meditating.



What about the Eastern men who can put themselves into a state where they can slow down their breathing and heart rates, and they can be put under water for an hour and come out unaffected? They do this by meditating.

How do I come up with solutions to all my programming problems that hit me from time to time? I sleep on it. Sleep is my favourite kind of metidating!

Those of you who go for long walks in the country on your own, or spend a great deal of time driving alone, will find you meditate without realising it all the time. How many people can think of times when you are walking or driving and your mind has gone off on a train of thoughts and dreams, and when you have woken up you are several miles along the road? (This is probably one reason why there are so many UFO sightings – people are a million miles away from their surroundings!).

What you have to do is take time out from your busy life and sit down and meditate. Sit down in a QUIET place where you know you won't be disturbed, and try to empty your mind of everything. Some people can just do this with no problems, but most will find they can, at first, only achieve this by staring at a twig, or a candle flame, or the second hand on a watch. If none of this works, try saying a simple word (A MANTRA) over and over in your mind (this is better than the thoughts that fly through your mind at a million miles an hour!).

Once you achieve this state of emptiness you can begin to listen to what your 86 per cent of wasted mind has to say about things. Don't worry if nothing comes at first. It will.

Out of interest, when I write I just drift off into a trance, and friends are amazed at how fast I can write, with very few typing mistakes.

PART II – How to keep your mind full of answers

It's hard to believe, but true, that everything you see, hear, think of and feel is remembered by your subconscious mind. If you come up with an un-explainable answer to a problem, then it is very likely that you picked up the information somewhere, but not consciously.

An Example:

A friend of mine wanted to get into the motorbike business, but had only a reasonable amount of money. In town one afternoon, he wandered aimlessley down a street and came across an empty showroom that would be perfect for displaying motorbikes. By that weekend he had sorted out a lease. His next problem was that he needed motorbikes to put in the showroom. Buying them was out of the question, as he had little money left, but then he had the bright idea of phoning people up who had adverts in magazines trying to sell their bikes, and he would persuade them to put them in his showroom, and he would take a commission off the sale's price for selling them.

He's doing nicely for himself!

What probably happened is that he was reading a local newspaper and he saw A) an advert for that showroom for sale, and B) lots of adverts for motorbikes that people wanted to sell. His mind put two and two together when he wasn't thinking and Hey-Presto!

The best way of getting lots of information into your head is by reading books and magazines on the subjects you are interested in, or want to get interested in. If you don't want to buy books, check out your local library. Books have been written on every subject, and as I said before, everything you read you will remember, even if you don't think you will.

For programmers looking for ideas, keep reading as many computer magazines as you can without spending too much. Also, TV, video, adverts and other promotional material is a good source of inspiration... And remember! Try to improve on, not imitate.

PART III – How to get your unconscious mind into action

If you have a problem you need to solve, then grab yourself a large piece of paper and write down your problem clearly at the top of it. Next, write as many possible solutions to the problem you can think of, no matter how silly or serious they are. It will all help. Then read through the list eliminating those that will not solve your problem. Hand it over to your subconscious mind with a specific time limit and then forget about the whole business. WHEN THE SOLUTION COMES, USE IT!! It will pop into your mind either when you're quiet, or when you're thinking about something altogether different! Amazing, but true...

Array Wide Array

Array in a manger, no subscript for a bed. Understanding arrays is as simple as learning a Christmas carol.

By Steve Burgess

There are times, when writing computer programs, that one needs to store a vast amount of data efficiently. Using an individual variable for each item of data you wish to store is very inefficient and very laborious and repetetive to program. e.g. if you wanted to store the name and address of somebody using individual variables you would probably have a program such as this.

```
10 INPUT"NAME:";na$
20 INPUT"ADDRESS:";ad$
```

This method is all very well if you only want to store one item, but more often than not you will want to store more than one item, maybe only two, but, on the other hand, maybe two thousand. Using the individual variable method the program for the above would be as follows...

```
10 INPUT"NAME1:";n1$
20 INPUT"ADDRESS1:";A1$
30 INPUT"NAME2:",n2$
40 INPUT"ADDRESS2:";a2$
40000 INPUT"NAME2000:";n2000$
40010 INPUT"ADDRESS2000:",
a2000$
```

...not only is the above program impractical it is also impossible on the good old 64 because variable names can only be 2 definable characters long.

However don't be put off, the sixty-four, and most other home computers, has a facility built into its BASIC which allows the storage of many thousands of data items in only one variable. This is callled an array and the program above can be converted into array format as follows...

```
10 FOR 1=1 TO 2000
20 PRINT"NAME";I;:INPUTna$(1)
30 PRINT"ADDRESS";I;:INPUTad$(1)
40 NEXT 1
```

...much better isn't it?

The program uses two variables, one for the NAME and the other for the ADDRESS, these in fact can be put into the same array by using multi-dimensional arrays but we will come onto that later...

It needs dimming, then it'll work

Now if you took time off to type in the last program you will find that, after typing in 11 names and addresses, the program crashes. Why? Well here's the answer. In order to allow the use of an array the computer must first allocate a section of RAM to the array, if an array is accessed without it first being defined then the computer doesn't know where to store the data so it crashes.

There is a command to put all this right the DIM command.

The DIM command allows you to allocate a section of memory for use by your array. In order to set aside this memory you must know how many items of data you are going to need so the computer can allocate an appropriate amount of memory. E.g if you know you are going to store 2000 items it is no good just allocating 5 variable locations in the DIM command.

So, if you want to store 100 items you use the DIM command as below...

```
10 DIM(99)
```

...you only type 99 because location 0 is also used, 0-99 makes 100 locations.

If you are unsure as to how many items of data you are going to need to store then put, in the DIM statement, the maximum number you think, beyond your wildest dreams, you will need.

Now before we go any further I want to give you a few of the technical names used in array storage.

Close your eyes (not really, just imagine yourself closing your eyes) imagine, if you will, an array stood lonely in the top half of a program...

```
10 DIM AR$(1999)
```

...the poor little thing, nameless and lonely. But not anymore, we are here to comfort it, to adopt it and to name it. Hurrah!

But before we adopt it we are going to split it into pieces, so get your trusty scalpel to hand, Doctor Frankenstein, and come to my side.

Here is the scalpelated array, just ignore the blood.

```
10      DIM     AR$     (1999)
A       B       C       D
```

Section A of the exploded array is the line number as used in any ordinary program, it is recommended that you put all array definitions, or dimensions, at the head of the program.

Section B is the DIM command, this tells the computer that the array that follows is not being accessed but being defined.

Section C is the array variable identifier, its use is two-fold, a) to distiguish one array from another, and b) to determine what type of variables may be stored in the array. AR$ means strings, AR means real floating point numbers, and AR% means integer numbers.

Section D is what is known as the subscript, you can have as many as you wish, memory permitting, but most people don't go above two.

We're going into two dimensions. Aarrggghh!

Although the arrays described above are useful they can only hold information about one subject, e.g an array defined to hold names can only hold names. It would be useful if you could store information about a persons name, address, sex, age, date of birth etc all in one array. Well you can. And this is how you do it.

Let's pretend you want to set up an array to hold information about the following attributes of a person...

```
NAME
ADDRESS
SEX
AGE
DATE OF BIRTH
MARITAL STATUS
```

and there are 100 people whom you wish to hold information about, then you could use a two-dimensional array.

But before we go any further I must explain something. Venturing into the realms of two dimensions inevitably brings us to another computer concept, records. Records have a language all their own, one which must be mastered to proceed with this article.

There are three main elements of records, these are as follows...

```
FIELDS:
RECORDS:
FILES:
```

...now a field is a particular piece of information about a person or subject, NAME is a field, as is ADDRESS, as are all the personal information headings above.

Fields join together to form records, a record is a complete account of a person or subject and every subject or person stored, has its/his/her own record.

All the records come together to form a file which is a collection of people/objects which all have one (or more) common denominator(s) E.g all the people in one file may work in the same institution. All the antiques stored on another file are held in the same warehouse etc.

Now you are aware of the language used in records and arrays I can proceed to inform you how to store the information mentioned earlier about 100 people in one array.

First of all you must write down the names of all the fields you need and next to them write a field number, starting at zero...

```
NAME            0
ADDRESS         1
SEX             2
AGE             3
DATE OF BIRTH   4
MARITAL STATUS  5
```

...then you take the number next to MARITAL STATUS and put it into the DIM command with the number 99 as follows...

```
10 DIMa$(99,5)
```

...you only use 99 because location 0 is used making room for 100 records each 6 (0-5) fields long.

Now to enter the data you simply use a nested loop and one input command...

```
20 FOR1=0 TO 99
30 FORs=0 to 5
40 INPUT da$(1,s)
50 NEXTs1
```

...the problem with this, however, is that only question marks will appear when you are typing in the data, it would be useful to have another array holding the field names and printing up the appropriated name, make the following additions and changes to the program...

```
10 DIMda$(99,5),fi$(5)
15 GOSUB100'read in field names
35 PRINT fi$(s)
.
.
100 FORk= TO 5
110 READ fi$(k)
120 NEXT k
130 RETURN
140 DATA name, address, sex, age, date of birth, marital status
```

Now if you run the program you will be presented with the field name before you enter anything.

You should now know all you need to know about arrays to produce a good database. If you produce, what you consider to be, an excellent program, I'm sure *Commodore Disk User* would be interested in seeing it and, if it's good enough, printing it for all and sundry to see. Good Luck!

Diary of a Programmer

Just when you thought you'd heard the last from me I discover that I have more to say

By Andy Partridge

Due to a severe brainstorm, I thought I had finished this saga of my daily events last month. But lo and behold, in the words of Jimmy Cricket 'Come here, there's more'.

Day 4096

It's taking a long time to get a simple demo done isn't it? I've had lots of trouble with my Amiga, School and Virus's thats why!

First of all, the disk drive switch dropped off one morning. Oh! what raptuous joy, especially as it is only two weeks old. I rushed it back to Megaland and they swopped it for me straight away, no hassle. (He's a very very nice man!). I would just like to say a big thank you to the sales manager, and also to a very good mate of mine Dave. He drove me down to Oxford and back TWICE in two weeks. Cheers Dave, that's a crate of beer I owe you. Whats that? You don't drink! Pass me the opener.

I then received a pile of school work to be done including, a Dry-joint tester, photographs and a folder of artwork. All this to be completed in a day. Then to cap it all, disaster of disasters, a B@?!ldy virus decides to rear it's ugly head. Destroys all my WP disks, Three reviews, an article and my brilliant computer-talk dictionary. What a B.,>?*d. From now on, SystemX is running on all my important disks. It really spoils the fun yuou can have with a computer if you have to be constantly aware that something could be eating into your headers, files and any or all of your disks.

Day 5789

(Guess who lost count)

Bizzmo informs me that he's started work, and thats the reason why he has not sent me any text or grafix. He absoloooooootly assures me that he will have everything done by next Monday. Otherwise I can chop his legs off and boot him where the sun don't shine. Ha!!

Deek says that he is having a 'Not bothered about my computer' phase. People tend to have phases like this when they don't like to do anything on their computer. Like, a phase when they play nothing but games. Maybe a phase where they do nothing but code. As for me, my current phase is to absolutely nothing but write articles for a certain Mr. Eves. (Less of the Mr. if you don't mind young man....Ed!). I was quite happily doing this when that Damn virus ruined all my files. I'm going to kill you! Yes you, you stupid pain in the.....(censored).

Day 10293

Funny day today. Decided to boot up my 64 and spend some time working out why my menu system will load some files, but not others, (this will be the NEW menu system for CDU, when I iron out the problems), It seems really funny. It's hard testing this sort of thing out. You have to assemble, run and then try to load the offending file in, and if there is no success, load up the assembler, source etc etc and try again. This went on for several hours with no avail. Tomorrow I will look through some of the work from other people to see if I can find the answer. Hmmm! Actually, this new menu has proved to be quite a pain in the butt. Mr. Eves, (Oops! sorry), Paul rang me up in the middle of the night a few days ago. "What are you playing at Andy?" he says. "This music in your menu, it's not original is it?" Yes, I reply, Nutt did it for me. Says Paul, "No, I mean it's not an original tune". Why of course not says I. "You great steaming idiot Partridge" says one very unhappy Editor. "What are you trying to do? Get us all sued". Gulp! Sorry ASP/CDU/ Paul I didn't realise. Honest.

Day 34875

No luck looking at other peoples methods, they all seem to crash as well. I'll try another approach later. I'm getting pretty fed up of the need for so many decoders with satellite dishes. By the time you have got all the decoders for all the stations you.....Sorry, I'm wandering again.

Day 45763

Spent an exhausting weekend at Kelly's house as her parents went away. Now just hold on! It's not what you are thinking, (or what you was hoping...Ed!), her Dad asked me to stay to look after the place. Consequently I didn't do much work at all. On Monday Paul gets back from his hols in Inverness. He's not going to be very happy when he finds out I didn't get the new Menu ready for the January disk. Uh Oh! (No, MISTER partridge, I'm not at all happy!!..Ed)

Day 50377

Actually, Paul wasn't at all mad about me not having the Menu done in time.

Just as well really, wasn't it. (Thats what he thinks...) I cannot for the life in me find a solution that works with absolutely every program that's likely to be put on the disk at some time or other. Think man, think.

Day...erm...Well

It dawned on me that Bizzmo hasn't run yet, so I'm going to chop his legs off. This means that I am not going to have the demo in time for this issue of CDU. Which in turn, isn't very good for me, you the reader, and above all – Paul. (Sorry your highness. It's not really my fault. Grovel, grovel)

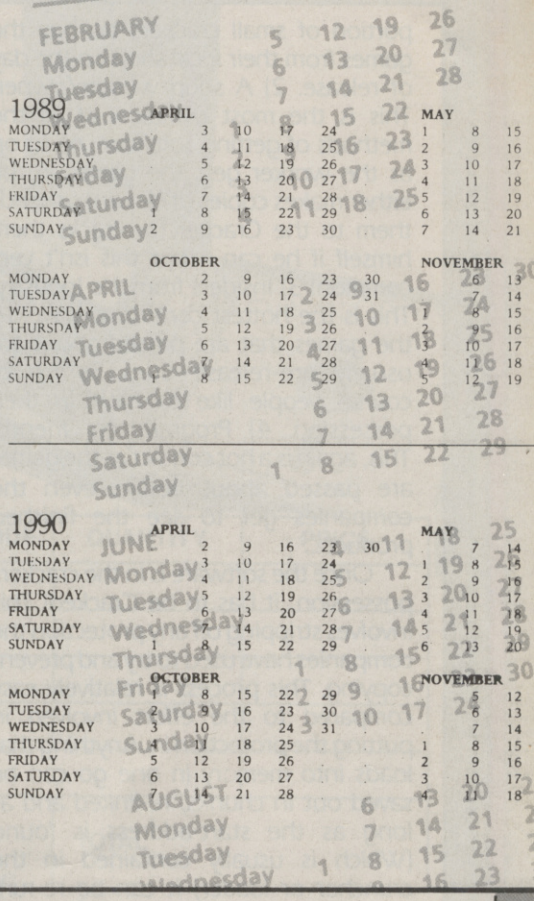
Today

And so, as light dawns on marble ground, I will talk about the linking together of the intro for this demo. First I took the main code, graphic files, music (not copyright this time) and the scroll text and saved it onto one disk. Next, I loaded Crosslinker and linked the whole lot together. After linking, I loaded it up and...IT WORKED first time. (Shock, horror!) When space is pressed, a short program copies itself to the screen. This program moves the whole of memory from $4000 upwards to $0800 upwards and performs a RUN. This allows several programs to be held in memory at once (Or several demo parts).

Tomorrow??

Well, all I managed to wrestle off Bizzmo was a few rough pictures that he has done. What they are is a sequence of pictures of a knight on a horse being zoomed in on. Not bad, but there is no chance that I get them, sent down the phone lines and into a program in time for this issue!

I hope this diary has been interesting (??) reading for you so far. The REAL final part will come as soon as I get the rest of the grafix and finish the remainder of the codeing. See you all soon!



1989

	APRIL					MAY				
MONDAY	3	10	17	24		1	8	15	22	29
TUESDAY	4	11	18	25		2	9	16	23	30
WEDNESDAY	5	12	19	26		3	10	17	24	31
THURSDAY	6	13	20	27		4	11	18	25	
FRIDAY	7	14	21	28		5	12	19	26	
SATURDAY	1	8	15	22	29	6	13	20	27	
SUNDAY	2	9	16	23	30	7	14	21	28	

	OCTOBER					NOVEMBER				
MONDAY	2	9	16	23	30	6	13	20	27	
TUESDAY	3	10	17	24	31	7	14	21	28	
WEDNESDAY	4	11	18	25		1	8	15	22	29
THURSDAY	5	12	19	26		2	9	16	23	30
FRIDAY	6	13	20	27		3	10	17	24	
SATURDAY	7	14	21	28		4	11	18	25	
SUNDAY	1	8	15	22	29	5	12	19	26	

1990

	APRIL					MAY				
MONDAY	2	9	16	23	30		7	14	21	28
TUESDAY	3	10	17	24		1	8	15	22	29
WEDNESDAY	4	11	18	25		2	9	16	23	30
THURSDAY	5	12	19	26		3	10	17	24	31
FRIDAY	6	13	20	27		4	11	18	25	
SATURDAY	7	14	21	28		5	12	19	26	
SUNDAY	1	8	15	22	29	6	13	20	27	

	OCTOBER					NOVEMBER				
MONDAY	1	8	15	22	29	5	12	19	26	
TUESDAY	2	9	16	23	30	6	13	20	27	
WEDNESDAY	3	10	17	24	31	7	14	21	28	
THURSDAY	4	11	18	25		1	8	15	22	29
FRIDAY	5	12	19	26		2	9	16	23	30
SATURDAY	6	13	20	27		3	10	17	24	31
SUNDAY	7	14	21	28		4	11	18	25	

Hacking ???

To hack or not to hack, that is the question. Whether it is nobler to.....

By Andy Partridge

Crackers, Hackers, Pirates... Call them what you like but they exist in a very big way. The software industry claims to hate them, but a good 70% of software house employees are no better! This article tries to go into more detail about this exclusive band of law-breakers.

Computer software IS expensive, and with 16 bit games retailing at 25-35 pounds a throw it's hardly surprising that people would sooner copy it than purchase it isn't it? But don't get me wrong, I'm not saying that software shouldn't be priced that high, because as a programmer myself I know the effort involved in creating a game from scratch, and I like to have a large cheque in return for my nine months effort.

But enough of this, who actually are the pirates that are causing all the damage we heard about? Is it the two friends who go halves on a gazme and then one gets a copy of it? Is it the user groups that split the cost of a business package 20 ways, and then all take copies? Or is it the 'Hackers' who mass copy maybe 50 disks of 8 games a week and post them all over the world? Hmm.... shall I answer that one?

So... How do the crackers go about their mass-copying? Well, first the game has to be gotten hold of. This is done in a number of ways: 1) Buying them. This is done more than the industry seem to think. A large pro-

portion of small crackers do buy the games from their local shop on the day of release. 2) A shop worker/owner. This is the most common of all the methods of getting software. As so on as the worker gets the games in, he either makes copies (If he can) or sends them to the Cracker (or cracks them himself if he can – but this isn't very common) 3) Insiders from the Industry. This is the hottest contact to have, as the games that are passed about are usually pre-release titles, which of course people like to have in their possession. 4) Programmers friends. This, again is a hot contact as the games are passed about before even the companies get to see the finished product....

Once the software is in the crackers possession, it has to be Cracked! This involves stripping off any protection the companies have used to try and prevent copying. This process is relatively easy compared to the effort involved in putting the protection in. Anything that loads into memory in one go can be saved out in chunks, re-linked and as long as the start-address is found (Which is usually contained in the cruncher or loader) it can be re-run, and copied at will. Multi-load games are slightly harder, but not by much. Programs have been written by crackers that copy the files off tape onto disk, and a few alterations to the program later and it, again, can be copied freely. Protection against cartridges is pointless where hackers are concerned, they just attack the loader of the program and re-write it so upon loading the game is dumped to disk. Easy. Not all methods of protection are this easy though, some games have slowed up, but NOT stopped, the crackers for a while. Hawkeye took 24 hours to be cracked by a Scottish Cracker, and Speedball seemed easy until 80% of the cracking groups found that their crack crashed at the end of a level.

After cracking, the game is 'Trained'. This invoves putting in options for infinite lives, bullets, fluffy dice and in fact anything that makes the game easier to play, and usually, makes it so easy that it can be completed in a very short sitting. Waste of time for all that playability testing eh?

Finally, before the game is copied, a small intro program is linked onto the front, with a logo of the group who cracked the game, information on who cracked it, a few craxy jokes and a 10K list of greetings to all the crackers in the world.....

Once a game is cracked and crunched (Crunching is the process of compacting the games code as small as possible, with a program that un-compacts it on running) it is then put on the groups latest "Spread Disk". This is a disk of all the latest games, demo's, news and charts from the group, filled up with other peoples stuff if there is room. The disk is then copied as many times as the group has contacts.

'Contacts.' this is what the cracking scene is mainly about. The more contacts you have with other cracking groups and people, the more software you are going to get. Software is mainly posted from place to place, just like any letter you would post to your great Aunt Edda in Great Yarmouth. A persons Contacts could be anywhere in the world, the crackers are just as active in the USA, Germany, France, Italy and even Australia. All the groups around the world are posting software to each other every week. I suppose this is why the industry gets so upset!

But that is not the end of the story? Oh no, far from it. The cracking scene is an amazing Hierarchy. Those who are not as good as others at this 'Art' get trampled on. Seriously trampled on. "LAMERS" they are called. A cracking magazine recently ran a competition, asking the readers to send in their definitions of a Lamer. They were far from the same. A Lamer, generally, is someone who isn't very 'Big' in the cracking scene, or a Big person who does something that offends another big person, or someone who makes a big mistake, or someone who writes a program that isn't as good as another persons program. Its a tough world in there, I can tell you!! Everyone is always slagging everyone else off, and they do a pretty good job of it at times. Federations are built up against people that do something that offends someone, be it a simple mistake or not. The crackers intro's are constantly filled with death-threats to other crackers... and why? Just because someone copied an idea, or didn't return a disk, or said something about them!!! You may laugh, but it's true! Weeks before shows, phone conversations are alive with talk of who's going to get a good kicking at them!! Hahahaha! It's mad! People drive up to peoples house's, and throw bricks through their windows just because they said that a program they wrote was s!*? It has happened, on several occasions!

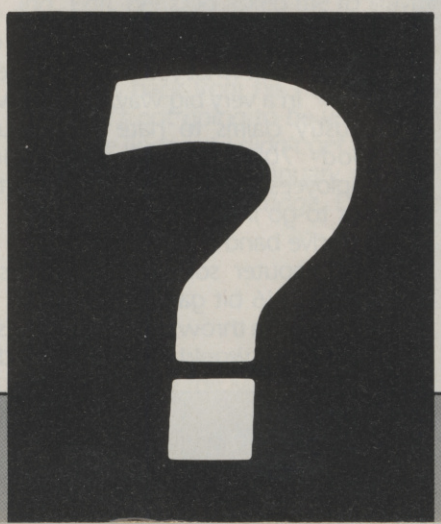
'Copy-Parties' are held, where crackers take all their new software, their 64 and a TV and spend however long the party is on for (Sometimes 2-3 days!) copying software! Demo-competitions are held, where groups write demo's to compete against each other. A prize is often given, but the competitions often result in arguments and more death threats.....

Not only this, but software is becoming something a lot more seriosu: New software is seen as power! A person who gets all the latest titles into his possession the day of their release, or earlier, is seen to other crackers as some sort of God! They give him money, hardware and a host of other things in return for copies of these new games!

Companies are just as bad, Four figure cheques are handed out to some people in return for pre-release software from a competitors programming team! Hahaha! Those people are laughing all the way to the bank.....!!

Software can be used to get hold of a lot of other things as well as more software. There is now a growing trend in people wanting video's and music. Not the stuff you can get in the shops, Oh no... But stuff that is banned, or video's that are just coming out at the cinema, or even *BEFORE* they get to the cinema! Music that can't be got in shops; exclusive songs a group has recorded for themselves only, but mainly mix's that DJ's in nightclubs have recorded while working.... Now THATS what I like!

Is it the group of friends who buy one CD, and copy it? Or is it the local DJ who hands out compilation tapes of all the songs he's played that night? Or is it.....



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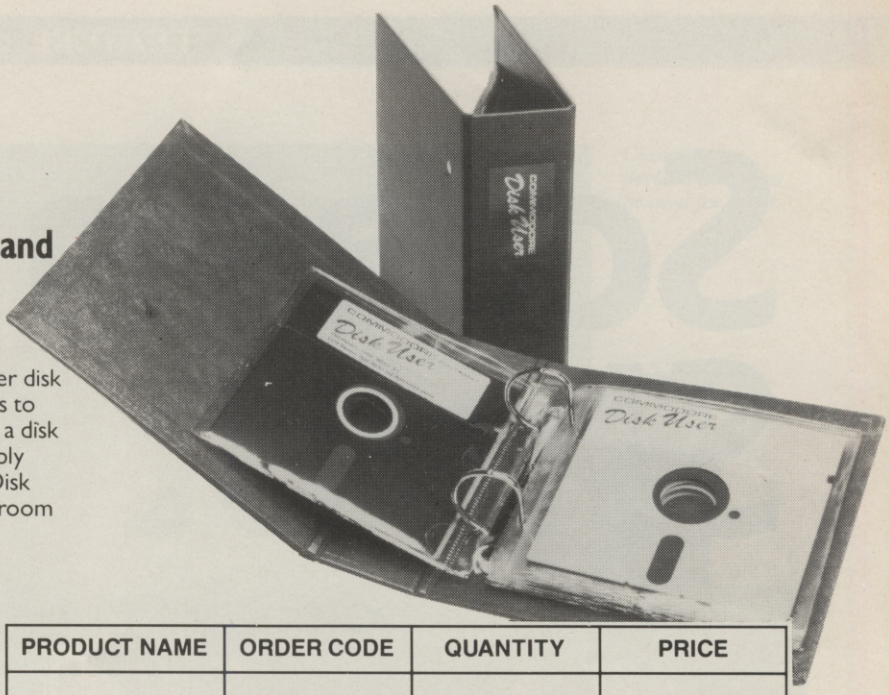

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Screen Shot Shoot

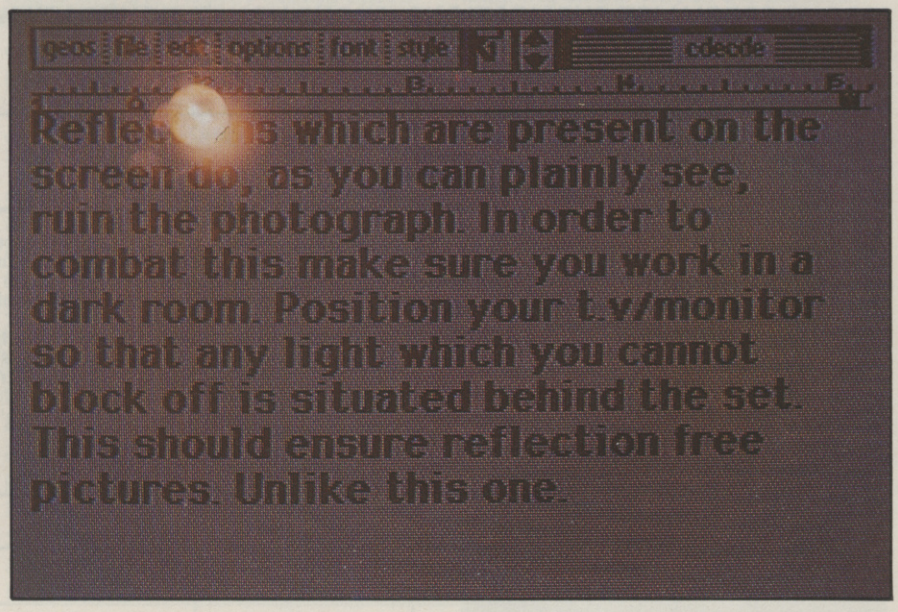
The art of taking decent screen shots need not be as difficult as you might think

By Steven Burgess

If you have ever tried photographing your latest blockbusting graphics screen, or the last level of a rock-hard arcade game to prove completion to your friends, or a screen shot from your latest program for inclusion in CDU having had very unsatisfactory results, or you haven't tried yet but would like to take pictures of computer (or just ordinary T.V) screens for either yourself or CDU, then read on.

This article will tell you how to achieve the best results from screen photography and how to take pictures for submission to CDU on either black & white or colour film.

The basic requirement for screen photography is a single lens reflex (SLR) camera. The reason this type of camera is most suited to photographing computer (or any) screens is the versatility it permits with respect to shutter speed. And also the fact that a SLR camera is built so that what you see is, essentially, what you get. This is an imperative feature for close up work as is evident when pictures taken with two lenses, a view finder and an actual objective, are seen. Because the two lenses are not located in the same place on the camera you actually get a different picture than what your viewfinder shows you, this is not the case with an SLR as you see through the same lens as the picture is taken through.


geos file edit options font style
Reflections which are present on the screen do, as you can plainly see, ruin the photograph. In order to combat this make sure you work in a dark room. Position your t.v/monitor so that any light which you cannot block off is situated behind the set. This should ensure reflection free pictures. Unlike this one.

In addition to the SLR camera you may also require a tripod for screen photography as slow shutter speeds are needed to coincide with the screen update speed. If the shutter speed is too fast you will only get a partial image. If, on the other hand, the shutter speed is too slow you will, if the screen is animating, get a blurred image.

If you do not own an SLR camera but do own a camera which has a built in T.V mode set for the PAL system (see your instruction booklet) then you may easily take photo's of the screen. However, if your T.V camera is a fixed focus wide angle compact then you may not be able to focus at a distance where only the screen is in shot. With an SLR camera no such problems occur. Because SLR cameras are the most versatile, I have geared this article towards the SLR photographer. However, all information concerning framing, film types and packaging is appropriate to all photographers.

If you own a standard compact camera with no shutter speed variability then it is probably 1/60th of a second and is too fast for screen photography. That is, only a partial image will be attainable.

Film

The film you will use depends on which type of photography (colour or b/w) you wish to do and what you plan to do with your photographs once they are processed and, if appropriate,

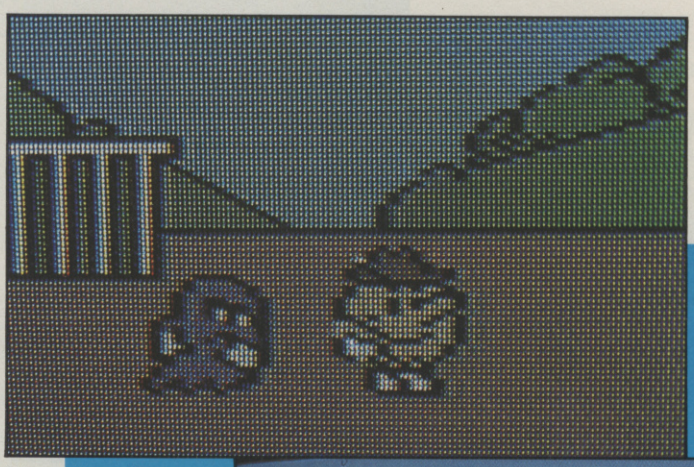
printed.

As this article has really been written for those of you who wish to submit photographs with their own games or programs, I will first explain the film types you should use for submitting to CDU.

Colour

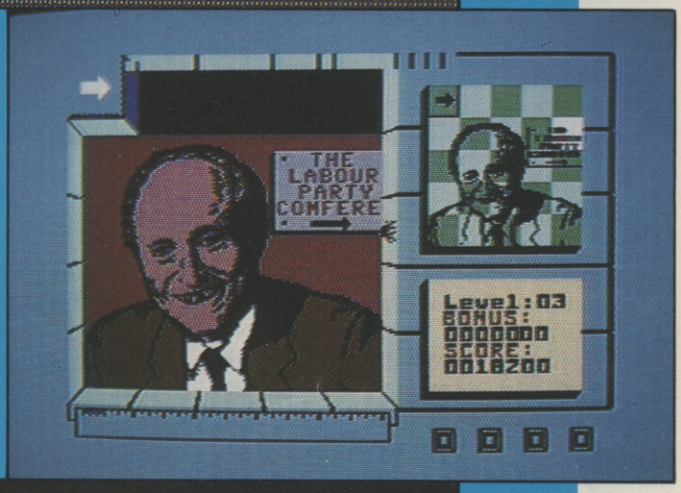
If you want to take colour photographs of your screens then it is essential for you to use colour slide film (or transparency film). This is identifiable in shops etc as it usually has the suffix-chrome (e.g fujichrome, kodachrome etc). The reason you must use slide film is as follows: The slides you receive when you get your film processed are actually the film contained inside the cassette cut up into little pieces, so the slides are a first generation original of the pictures you took. With print films, the prints you receive are second generation copies of the negatives which you also receive after processing. So if you sent prints into us to be included in the magazine, the final image, that appears in the magazine, would be a third generation copy and would therefore be of much less quality than the original print and even less than of the negative. If you sent us slides then the image which would appear in the magazine would only be a second generation copy and therefore the quality of the picture would be better. So only send in colour slides if you want them to be printed, if you send prints you can be sure that they won't be.

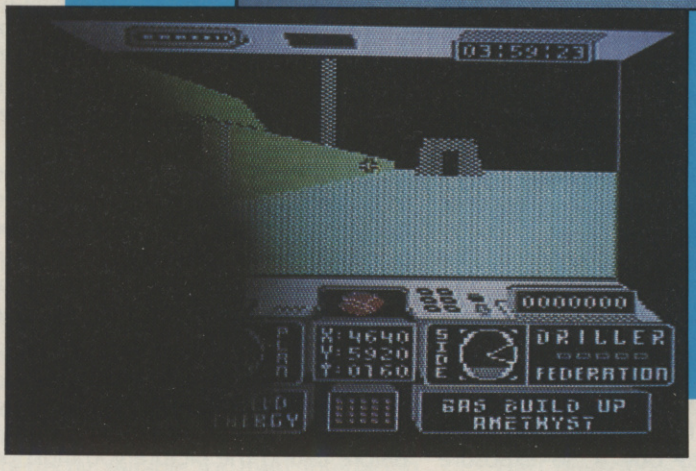
Another point concerning slides is the mounts. As you will probably be sending your photographs by post, it is inadvisable for you to use glass mounts. Only use the card or plastic variety.



Close up of pacland hero, can be used for effect.

Picture framed incorrectly, tv visible.





Object blocking lens.

Black & White

With B&W films the above rules do not apply, for two simple reasons. Firstly the quality of an average B&W print is much higher than that of an average colour print therefore less quality loss is apparent, and secondly, although it is possible to purchase them, B&W slide films are not as readily available and not as widely stocked as colour slide, colour print and B&W print films.

ISO/ASA/DIN

There was, at one time, only two film speed classifications. The ASA and DIN classification. Supposedly to avoid confusion these have been superseded by a new one which, in fact, is simply the ASA followed by a stroke followed by the DIN, and more often than not is only referred to by it's first number. Anyway, as ISO is the new rating I will use it in this article.

A film with a high ISO e.g 3200 can take a picture of a dark screen faster than a film with an ISO of 100. This is because the film is much more sensitive to light and therefore needs less exposure, that is the shutter speed can be faster. However, when taking pictures of the screen the shutter speed is predetermined and therefore cannot be changed. Well, as this is the case, how do you know which film speed to use for which screens as some screens have different degrees of brightness than others. The answer is you can use one speed of film for all

of your screen-shots. If you have an SLR camera you will probably know about aperture and depth of field. As the screen is flat, depth of field is not required and can therefore be ignored, however the aperture changes size to allow different amounts of light in, so your camera can be adjusted to make the perfect exposure for the particular screen. I recommend that you use an ISO of 100. The aperture adjustment ring is situated on the lens.

Correct Exposure?

The way to get a correct exposure for a screen is to use an exposure meter or light meter. If you own one of these then you probably know how to use it, if you don't own one then it doesn't matter. The shutter speed you will always require is 1/15th second. If your meter fluctuates when you point it at the screen try to get it so 1/15 is at the centre. If your camera has a built in meter then follow the same advice, change the aperture until the recommended shutter speed is around 1/15th second. The screen actually updates every 1/25th of a second, but few cameras offer this speed, most having 1/30th after 1/15th. If your camera does have 1/25th or 1/20th then use it, otherwise use 1/15th.

If you are taking the photographs for your own personal pleasure and you have no aspirations to having them printed in magazines, then colour print film is perfectly adequate. Also it is much more convenient as a slide-projector/viewer is not required. The print can be held in the hand and enlargements of it can be made to sizes up to 30" x 20", if not larger.

The film is readily available and quite cheap, it is possible to buy a 36 exposure print film for £2.20. But then it is possible to buy a 36 exposure transparency film for £3.50 including processing and mounting.

Framing

This is simple when taking pictures of the screen. There are a few do's and don'ts which should be followed under most circumstances.

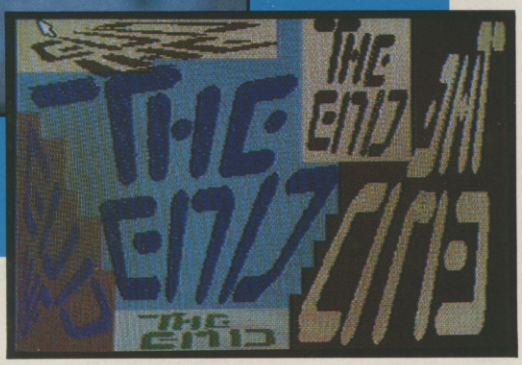
Do's

DO make sure that the camera back is parallel to the screen.

DO make sure all of the screen is present in the viewfinder. On CBM 16/64/PLUS4/128 the border can be ignored.

DO use the self-timer or a cable release to activate the camera. If you use the normal release button you may shake the camera and, therefore, ruin the piccy.

Out of focus, ruins picture as you can see.



THE END!

Don'ts

DON'T allow any of the tv/monitor casing to be present in the viewfinder, it can always be cropped out later but it means more work and smaller picture.

DON'T concentrate only on one small area of screen, when enlarged for the magazine the result will be horribly blocky. Sometimes, however, this can be done for effect. E.g a picture of the damsel in distress at the end of the game.

Taking The Shot

Before taking the picture you must do the following things:

1...Lower the contrast of your television set slightly.

2...Make sure that there are no reflections on the screen.

3...Check your camera is set to the correct exposure setting.

4...Wind on the camera so you are ready to shoot.

5...Remove the lens cap.

If you follow these guidelines you should end up with some pretty decent pictures, providing, of course, you have chosen interesting displays to photograph. Don't, for example, take a picture of a screen of your latest game which only has the words "GAME OVER" on it. To emphasize the Do's and Don'ts see some of the pictures decorating the article.

Packaging

Photographs, either print or slide, are pretty delicate things and one crease or scratch will ruin them beyond repair. In order to assure a safe journey from A to B follow the packaging hints below.

PRINTS: Take two pieces of very stiff card which are bigger than the print. Put them together and on three edges stick them with tape to make a kind of envelope. Then simply pop the print inside and post them off in an envelope as close to the size of the card envelope as possible.

SLIDES: If possible have your slides mounted in card. Plastic is a second alternative but never choose glass. Then for each slide make a pocket as with a PRINT (above) and put them all together in a strong envelope. If you want extra protection make a larger card envelope and put all the smaller envelopes into this, then put the large envelope into an ordinary envelope of a similar size.

Now it's time to say pip pip to me and all my kin.

I would like to thank you chaps (poetic license, of course I mean ladies too) for kindly dropping in.

You're all invited back next month to this locality. I don't know who'll be chatting to you, it certainly won't be me.

65XX INTERFACING

We begin a series on interfacing with the 65XX series of microprocessors

By Steve Carrie

If you have ever laid your hands on your machine's programmer's reference guide (difficult if you own a Plus 4) then you're probably aware that there are a number of digital electronic devices which go to make up your computer. Names like VIC, SID and TED are familiar to Commodore machine owners all over the country; all over the world for that matter. There always seems to be at least one article in the magazine which targets one of these chips as it's subject, which is not surprising since the facilities that these chips provide are often the mainstay of the machine's user-interest.

With these devices to occupy your interest, it's easy to ignore the other chips that go to make up your machine. Without them, the machine would not operate correctly and yet very little attention is paid to them. Foremost among this forgotten army of multi-legged animals are the various interface chips. On the VIC 20, there are two 6522 Versatile Interface Adaptors (VIA's); on the C64 and C128 you will find two 6526 Complex Interface Adaptors (CIA's). As for the Plus4, you have on 6551 Asynchronous Communications Interface Adaptor (ACIA) and also a pair of 6529 Single Port Interfaces (SPI).

You may have noticed that each of the chip numbers begin with 65. These are all part of the 65xx microprocessor family and the VIC 20, C64, C16, Plus4 and C128 computers are all based on this series.

In this series of articles, I hope to give you an insight into how you can use these devices in your programs to perform useful tasks with surprisingly little effort.

A quick history lesson...

The original head of the family was the 6502 microprocessor (as used in the VIC) which had no on-chip I/O facilities and relied to a great extent on the 6520 Peripheral Interface Adaptor (PIA) to connect it to the outside world. The PIA had two 8-bit bi-directional I/O data ports and was perfectly suitable for most interfacing applications.

Not long afterwards the 6522 VIA appeared, providing many additional features such as two 16-bit interval timers and a serial data shift register which could be used to perform serial/parallel/serial data conversions.

With the release of the Commodore 64, and the takeover by Commodore of the MOS Semiconductor manufacturers, came the 6510 microprocessor which was basically a 6502 with an on-board 8-bit I/O port which appears in zero-page memory as two memory locations. The 64 also saw the appearance of the 6526 CIA device which is not unlike the 6522 but with a more flexible opeation. It also includes a 24-hour time-of-day clock with alarm facilities.

With the Plus4 and C16, the 7501 processor appeared. This is yet another 6502 derivative with on-board I/O facilities. Commodore also saw fit to include a 8551 ACIA (6551 derivative) in the Plus4 for the RS232 interface. Up until this time, RS232 had been handled by software emulation using the VIA/CIA devices. The Plus4 also had facilities for a parallel port handled by a 6529 Single Port Interface (SPI) chip. Another 6529 is used for keyboard I/O (not directly handled by the 8530 TED chip).

The Commodore 128 dual processor computer used a 8502 processor and employed two CIA's for I/O, presumably to retain compatibility with the C64. No doubt the designers had fun interfacing the 65xx series chips with the Z80a processor...

Chips with everything

Whatever processor is used in your computer, it will rely on a support chip such as a CIA to connect it to the outside world. Devices such as the 6561 VIC, 6566 VIC II, 8530 TED and 6581 SID are designed to provide specific facilities such as sound or vision. CIA's,

VIA's and ACIA's are more general-purpose devices and, as such, are often more difficult to make effective use of by virtue (or otherwise) of their flexibility. This may be the reason that so little is written about them. It's not that no-one is capable of programming them, it's just that no-one can be bothered.

Take a look at what's provided on-board the CIA (C64 and C128) for example:

Two 8-bit bi-directional I/O ports with hardware handshaking. These may be programmed in such a way as to operate as a single 16-bit parallel data port.

Two 16-bit counter/timers which may be linked together to give a 32-bit counter/timer.

One 8-bit serial shift register which is capable of bi-directional serial/parallel data conversion. Several CIA's may be linked together to exchange data.

A 24-hour time-of-day clock with an interrupt-based alarm feature.

...and you get two of these. The ability to connect several VIA's or CIA's together via the serial facility is of special interest since it is possible to set up a network of machines where one acts as a master to arbitrate between a number of machines. In short, what you get is a computer network where machines may exchange programs and data.

Connect some electronics to the data ports and you may control or monitor external equipment such as relays, lights, washing machines, etc, etc. the possibilities here are endless and only limited by your imagination and bank balance.

I'll start by taking a detailed look at the 6526 CIA which will be of interest mainly to C64/128 owners. Following this, the Plus 4's 8551 ACIA and 6529 SPI will come under the spotlight and I'll show you how you can transfer data between a 64/128 and a Plus 4 (either way) via an 8-bit parallel interface.

I've included some programming examples where appropriate. If you want to make effective use of the I/O facilities then you may want to obtain some of the following:

- 0.156", 24-pin (12+12) connectors (for the user port) (definitely required. Two or more)
- 36-pin Amphenol plug (centronics printer plug)
- Some ribbon cable, or similar wire.
- A small soldering iron and some solder

All of these may be obtained from an electronics supplier such as Maplin Electronics. For most of the examples, a second computer will be required and a Centronics parallel printer.

Whilst some of the programming examples are written in BASIC, a knowledge of assembly language would be a distinct advantage when we deal with the more complex programming aspects such as the timers and is definitely required for the interrupt examples.

Definition of terms

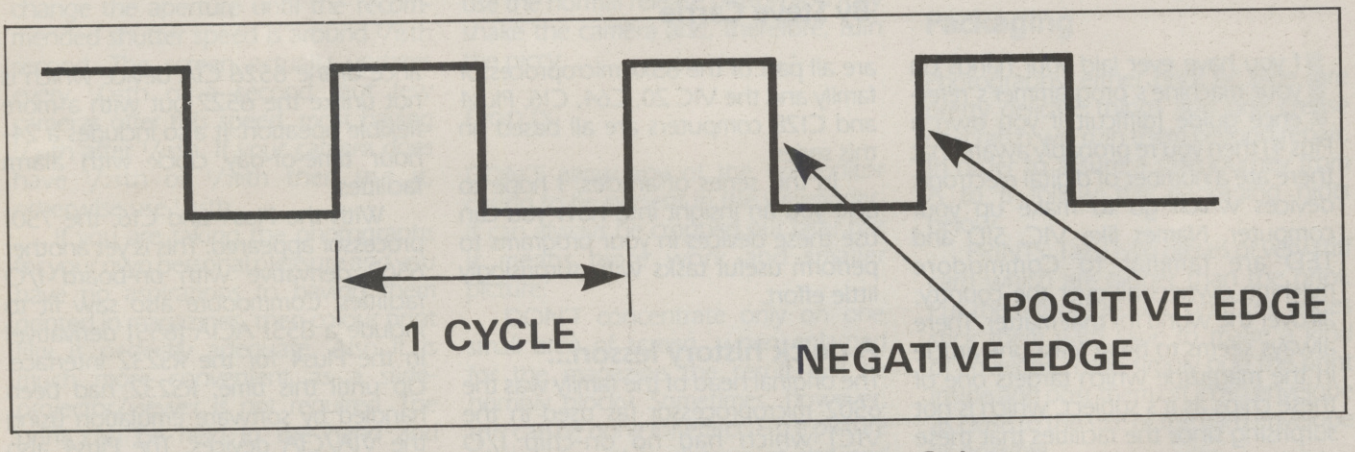
To finish off this first episode, I'll explain some of the terms used.

Port
Just as a sea port is a country's link to the outside world, a computer's port is it's link to the same. In the sense of the CIA's etc, a port is a collection of two-way input/output (I/O) connections through which information may be passed between the computer and an external deice.

Handshake
The process of signalling between devices. The basic purpose of handshaking is to regulate the flow of data. Handshake may be software or hardware controlled. Hardware handshake requires that there are dedicated hardware connections between communicating devices. Software handshake is usually accomplished using control byte codes and is used where hardware handshake is either impractical or undesirable.

Ttl
Short for Transistor-Transistor Logic; one of the major families of logic devices available. These devices operate from a 5V DC power supply. Operates with logic 1 at 5V, logic 0 at 0V.

Cmos
Short for Complementary Metal-Oxide-Silicon (or Semiconductor). The other major family of logic devices. Operates over a larger voltage range but for our purposes, much the same as TTL.



Cycle
All operations performed by a microprocessor are regulated by a system clock. This is normally a TTL-logic level square-wave and one CYCLE is one complete transition of the signal.

The speed of the system clock is measured in cycles-per-second (Hertz or Hz for short). The clock speed of about 1mHz (1 million cps). Although not to be taken as gospel, the speed of the clock determines how fast your machine operates. The BBC, for example, has a 2MHz clock.

When the processor executes an instruction, it may take one or more cycles to complete it. If an instruction is completed in 4 cycles, then on a 1MHz system, you could execute the instruction about 250,000 times a second! This may sound fast, but

consider a 25MHz 80386 processor as used in the most recent breed of PC compatibles and you can see just how slow it really is by comparison...

Interrupt
The process whereby the normal progress of a program is temporarily suspended while another is executed. The routine which is used is known as an interrupt service routine.

Register
A collection of data bits collected together to form a data byte which is, in the case of the 65xx series, mapped into a memory location.

Flag
Usually a bit in a register which indicates whether or not an event has taken place (e.g. an interrupt; see POLLING)

Polling
The process of checking the state of one or more flags to determine if an event has taken place.

Logic
I don't need to tell you what this is, but I maybe need to clarify how "active" logic states are defined. ACTIVE HIGH logic defines the OFF state as being logic 0 and the ON stae as logic 1. ACTIVE LOW defines the OFF state as logic 1 and the ON state as logic 0. When a logic line is active low, it will be named with a bar across the top; e.g. $\overline{\text{FLAG}}$ or $\overline{\text{PC}}$. These would be pronounced "NOT FLAG" and "NOT PC".

If you take a quick look back to the diagram of the clock signal, you'll see positive and negative edges annotated. Sometimes you will see the term "edge sensitive" used to describe the operation of an input. A positive-edge sensitive input only operates when the voltage level rises from 0 to 1. A negative-edge sensitive input only operates when the level falls from 1 to 0.

Serial & Parallel
Two words used to describe methods of data transmission. A serial transmission involves sending data over a single wire bit-by-bit. Parallel transmission requires that data bits be sent over a number of wires at the same time. It doesn't take a genius to realise that parallel is much faster than serial.

BCD
Short of Binary Coded Decimal. A system whereby 4 bits may represent a number from 0 to 9 only. The 6502-type processors have a BCD arithmetic mode for just this.

Bus
A collection of wires or circuit board tracks that connect up several devices. You may have heard terms such as DATA BUS or ADDRESS BUS.

O.K. With that lot out of the way we can get down to business. Next time, I'll start looking at the 6526 CIA chip. In the meantime you may want to look up the relevant section in the 64/128 programmers reference guide (if you have one) to get a general overview of the device.

Techno Info

Our resident guru answers more of your problems

Dear CDU,
I am new to the computer world and my first system consists of the Commodore 64, 1541 disk drive, tape deck and Star LC-10 colour printer for which I would like to obtain colour dumps. I have tried a number of places but nowhere has offered me help. I would also like to know if there is a program equivalent to "DPAINT" for the Amiga available for the 64.
L/Cpl Pankhurst, The British Forces

Dear Mr Pankhurst,
The Star LC-10C printer certainly seems to be creating a number of queries in connection with colour compatible software on the Commodore 64 but I am pleased to be able to advise you of both some software and some hardware that may be of help. The software is the "Award Maker Plus" program which is available from F.S.S.L. This company have recently changed address to Masons Ryde, Defford Road, Pershore, Worcestershire and their telephone number is (0386) 553153. Also available through F.S.S.L. is a plug-in cartridge called "Super Snapshot v4" which boasts that it is the first in the world to be able to dump colour pictures to the Star printers. This would simply entail your displaying your chosen picture, pressing a button and then selecting a printing option. This costs just under thirty-five pounds. Now tothe second query. The Com-

modore 64s graphics can hardly rival those of the Amiga and so there is not such a high-quality art package. The memory available on the 64 also prevents such a high powered art package being written. One that is available and seems to be value for money is the "the Advanced OCP Art Studio". This has a large number of advanced capabilities and can be obtained through Datel Electronics. They are based in Fenton, Stoke-On-Trent and their telephone number is (0782) 744707. However, there are many other very good art packages available and I would advise you to consider greatly what sort of functions you want the package to provide before parting with your money.

Dear CDU,
I have just one small query. The magazine provides a disk every month and I would like to know whether I can use it on an Oceanic OC-118 disk drive.
Paul Taylor. Address not given.

Dear Paul,
That particular model is now only available from a limited number of retailers but when it was a popular drive it did claim Commodore compatibility although one can never be certain that all commercial software will work 100% correctly. However, I can see no reason why the disks supplied with the magazine should not work on that drive.

Dear CDU,
I recently copied out a program from a magazine that I received free – "Your Commodore C16 and Plus/4". The text stated that the program could be easily converted to the Commodore 64 with a few minor alterations such as the IF, THEN statements which, on the C16 version, contained ELSE statements. In order to get it to work I added an extra eleven lines. The program works so far but when I try to save or load, I get a File Not Open Error. I have tried a variety of alterations but all to no avail. I have therefore enclosed the magazine, a printout of the program and also the disk with the program on it. I sincerely ask will you please advise me where I have gone astray.
Mr A. P. Collins, Hull.

Dear Mr Collins,
Firstly I must thank you for enclosing a disk and printout of the program – it makes the process of debugging a whole lot easier. Unfortunately the errors lie in two main areas. Most importantly, you have misunderstood the operation of the ELSE command but also, there is some confusion over the operation of the 64's GET command when reading from the keyboard. With the C16 a command like GET KEY$ will wait until a key is pressed and then store the result in KEY$. However, on the C64 the same command would not wait, it would simply scan the keyboard and if no key was pressed it would return a null string. You will therefore have to add a "trap" that prevented the computer from continuing until a key was pressed (ie: 10 GET KEY$: IF KEY$="" THEN 10). The ELSE command simply performs a different operation if the original condition is not true. For example: 10 IF KEY$="M" THEN D=8: ELSE D=1. This would set the variable D=8 if the key M was pressed but if a different key had been registered then the variable would be set to one. In Commodore 64 BASIC there are a number of ways to tackle it. The easiest is to duplicate the instruction after the ELSE statement before the original check. Using the example above this would become – D=1: IF KEY$="M" THEN D=8. This should not be done if another IF/THEN statement followed the ELSE or an OPEN statement is used. This would have to be tackled differently:

```
10 IF KEY$="M" THEN OPEN 2,8,0, "ACCOUNTS,S,R"
20 IF KEYS<> "M" OPEN1,1,1, "ACCOUNTS".
```

The reason you were getting file not open errors was for the initial reason that the computer was not pausing to wait for a key. In the original program you needed to press either D for disk or T for tape save. If no key is pressed at the instant that the scan is made then the 64 simply carries on and checks later to see which had been pressed (so that the correct type of file could be opened) failed. Therefore, no file was opened resulting in the aforementioned error. I hope that I have been of help and that you will now be able to amend the program.

Dear CDU,
I have just acquired an old Commodore 710 computer with green screen monitor, complete with 8050 dual disk drive and an 8032 printer. It seems similar to the Commodore 128 and works OK with basic program writing. The 8050 dual disk drive again works fine but the disk format is different on my 1541 drive and therefore my 64 stuff will not load on to the 710 and the cassette socket is the same as the 64, but when I try to load a tape, the 710 comes up with "Device not present". The printer works great and even answers all the commands. The questions are: Can the 1541 drive be connected to the 710 in place of the 8050 so that I can run 1541 format disks on the 710 and can any software still be obtained for the 710/8050 combination. Last of all – where can any of the above be purchased from, should any be available, and what sort of cost would I be looking at.
Mike Jones, Lancashire.

Dear Mike,
Unfortunately the Commodore 710 is now an obsolete computer and so far as I know there is no software still being marketed for the combination that you mention. I would expect that the BASICs are not totally compatible and I would therefore suggest that you do not attempt to follow further the idea of loading programs designed for the 64 and 1541 into the 710. This could be the reason for the "Device not present" error being created. The method used to store information on tape could be different and therefore the 710 is expecting a different format to that provided by the 64 tape. The problem could also lie in more technical details such as the start of BASIC memory. On the 64 this is 2049 ($0801) although the start of BASIC on the 128, for example, is higher up. Therefore programs designed for the 128 will not even load into the correct area of memory when used with the 64, let alone run correctly and this could be what is happening with your set up. I would therefore suggest that you do not try to connect together essentially uncompatible pieces of hardware and software.

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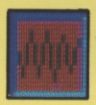

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